

Renoster 1 Wind Farm and Associated Infrastructure, Edenville, Free State

Final Scoping Report

Report Prepared for

Red Cap Renoster 1 (Pty) Ltd



Report Number 594114/2024/01B

DFFE Reference Number 14/12/16/3/3/2/2668



Report Prepared by



March 2025

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Profile and Expertise of EAPs

SRK Consulting (South Africa) Pty Ltd (SRK) has been appointed by Red Cap Renoster 1 (Pty) Ltd (Red Cap) to undertake the Environmental Impact Assessment (EIA) processes required in terms of the National Environmental Management Act 107 of 1998 (NEMA) for the Renoster Wind Farms Project.

SRK Consulting was established in 1974 and comprises over 1 750 professional staff worldwide, offering wide-ranging expertise in the natural resources and environmental sectors. SRK's Cape Town Environmental, Social and Governance (ESG) Business Unit has a proven track record of managing large, complex environmental and engineering projects in the Western Cape, Africa and internationally. SRK has rigorous quality assurance standards and is ISO 9001 certified.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the EIA are detailed below and Curriculum Vitae provided in Appendix A.

Project Director and Reviewer: Christopher Dalglish, BBusSc (Hons); MPhil (Env. Sci)

Registered EAP (no. 2019/413)

Chris Dalglish is a Partner and Principal Environmental Consultant with over 37 years' experience, primarily in Southern Africa, West Africa, South America, the Middle East and Asia. Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure and industrial sectors. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs), in accordance with international standards (e.g. IFC). He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies, and leads E&S reviews on behalf of financial institutions. He also has a depth of experience in Strategic Environmental Assessment (SEA) and Resource Economics.

Project Manager: Kate Steyn, MSc (Botany)

Registered EAP (no. 2023/6339)

Kate is a Principal Environmental Scientist with over 15 years' experience in Africa (South Africa, Angola, Namibia, Botswana, Mozambique and Kenya) and South America (Suriname). During this time, she has gained extensive experience in conducting and managing a broad range of projects, with a particular emphasis on Environmental and Social Impact Assessments (ESIAs) and associated management plans. Her experience includes project management of ESIAs to Equator Principles and IFC Performance Standards for large mining projects. Kate holds an MSc (Botany).

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by Red Cap. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Renoster 1 Wind Farm Scoping Report:

EAP Affirmation

Section 16 (1) (b) (iv), Appendix 1 Section 3 (1) (r), Appendix 2 Sections 2 (i) and (j) and Appendix 3 Section 3 (s) of the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of the National Environmental Management Act 107 of 1998 (NEMA), require an undertaking under oath or affirmation by the Environmental Assessment Practitioner (EAP) in relation to:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties;
- 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; and
- The level of agreement between the EAP and interested and affected parties on the Plan of Study for undertaking the environmental impact assessment.

SRK and the EAPs managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors. In this respect, SRK's standard disclaimer (inserted in this report) pertaining to information provided by third parties applies.
- To the best of our knowledge all comments and inputs from stakeholders and interested and affected parties have been captured in the report and no attempt has been made to manipulate such comment or input to achieve a particular outcome. Written submissions are appended to the report while other comments are recorded within the report. For the sake of brevity, not all comments are recorded verbatim and are mostly captured as issues, and in instances where many stakeholders have similar issues, they are grouped together, with a clear listing of who raised which issue(s).
- If applicable, information and responses provided by the EAP to interested and affected parties are clearly presented in the report. Where responses are provided by the applicant (not the EAP), these are clearly indicated.
- With respect to EIA Reports, SRK will take account of interested and affected parties' comments on the Plan of Study and, insofar as comments are relevant and practicable, accommodate these during the Impact Assessment Phase of the EIA process.

Note: An Affirmation signed in the presence of a Commissioner of Oaths is also included in Appendix A.

Kate Steyn

Name

SRK Consulting - Certified Electronic Signature

594114/45727/Report
6635-5517-2116-STEY-13/03/2025
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Signature

14 March 2025

Date

Note:

In response to stakeholder comments, the Scoping Report was updated at the end of the comment period to produce this Final Scoping Report for submission to the Department of Forestry, Fisheries and the Environment (DFFE).

All changes in the Final Scoping Report and Executive Summary vis-a-vis the previously released Scoping Report are italicised and underlined for easier reference.

*An **Issues and Responses Summary**, reflecting stakeholder comments received during the stakeholder engagement process and responses by SRK, is included in Appendix G.*

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Acronyms and Abbreviations

AoI	Area of Influence
BA	Basic Assessment
BESS	Battery Energy Storage Systems
<u>BLSA</u>	<u>BirdLife South Africa</u>
CapEx	Capital Expenditure
CBA	Critical Biodiversity Area
CCW	Counterclockwise
CIA	Cumulative Impact Assessment
CO ₂	Carbon dioxide
CO _{2e}	CO ₂ equivalent
CR	Critically Endangered
DALRRD	Department of Agriculture, Land Reform and Rural Development
DC	Direct Current
<u>DCSRT</u>	<u>Free State: Department of Community Safety, Roads and Transport</u>
DD	Data Deficient
DEA	(Former) National Department of Environmental Affairs
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DFFE	National Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EGI	Electrical Grid Infrastructure
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EN	Endangered
EPC	Engineering, Procurement and Construction
ESA	Ecological Support Area
<u>EWT</u>	<u>Endangered Wildlife Trust</u>
FEPA	Freshwater Ecosystem priority Area
<u>FDDM</u>	<u>Fezile Dabi District Municipality</u>
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GHG	Greenhouse Gas
GN	Government Notice
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management

IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
LC	Least Concern
LM	Local Municipality
LN	Listing Notice
LSA	Late Stone Age
LT	Least Threatened
MSA	Middle Stone Age
MTS	Main Transmission Substation
NCHRA	Northern Cape Heritage Resources Authority
NCNCA	Northern Cape Nature Conservation Act 9 of 2009
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEMA	National Environmental Management Act 107 of 1998
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Area
NGO	Non-Governmental Organisation
NHRA	National Heritage Resources Act 25 of 1999
NID	Heritage Notification of Intent to Develop
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
NWA	National Water Act 36 of 1998
OpEx	Operational expenditure
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PIA	Palaeontological Impact Assessment
POPIA	Protection of Personal Information Act 4 of 2013
PPA	Power Purchasing Agreement
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
Red Cap	Red Cap Energy (Pty) Ltd
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
RFB	Redox Flow Battery
RFP	Request for Proposals
S&EIR	Scoping and Environmental Impact Reporting
SABAP2	Southern African Bird Atlas Project 2
<u>SACAA</u>	<u>South African Civil Aviation Authority: Aviation Environmental Compliance Department</u>
SAHRA	South African National Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act 70 of 1970
SANBI	South African National Biodiversity Institute
<u>SANDF</u>	<u>South African National Defence Force</u>
SANRAL	South African National Roads Agency Limited

SANS	South African National Standards
SAWEA	South African Wind Energy Association
SCC	Species of Conservation Concern
Screening Tool	National Web-based Environmental Screening Tool
SDF	Spatial Development Framework
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SEI	Site Ecological Importance
SIP	Strategic Integrated Project
SOP	Standard Operating Procedure
SoW	Scope of Work
SPC	Spatial Planning Category
SPLUMA	Spatial Planning and Land Use Management Act 16 of 2013
SRK	SRK Consulting (South Africa) (Pty) Ltd
SSVR	Site Sensitivity Verification Report
StatsSA	Statistics South Africa
STC	Strategic Transmission Corridor
TOPS	Threatened or Protected Species
ToR	Terms of Reference
VECs	Valued Environmental and Social Components
VRB	Vanadium Redox Batteries
VU	Vulnerable
WEF	Wind Energy Facility
WUA	Water Use Authorisation
WUL	Water Use Licence
WULA	Water Use Licence Application

Units

AC	Alternating current
°C	Degrees Celsius
GWh	Gigawatt hour
ha	Hectare
km	Kilometre
km ²	Square kilometre
km/h	Kilometres per hour
kV	kilovolt
kWh	kilowatt hour
L	Litre
m	Metre
m ²	Square metre
m ³	Cubic metre
mm	Millimetre
Mt	Megatonne
MW	Megawatt
t	tonne
TWh	Terawatt hour (one trillion watt hours)

Glossary

Aquifer	An underground body of permeable rock or unconsolidated materials (gravel, sand or silt) which can contain or transmit groundwater.
Avifauna	The collective birds of a given region.
Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Biodiversity	The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity
Blade	A long, aerodynamic structure mounted on a rotor and designed to capture wind energy and convert this energy to rotational motion.
Blade feathering	The process of adjusting the angle of the wind turbine blades to control their interaction with the wind.
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Consultation	A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.
Controls and monitoring system	Components of a wind turbine that track wind speed, direction and turbine performance and adjust the blade pitch to optimise electricity generation while ensuring safe operation.
Critical Biodiversity Area	Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Curtailment	To temporarily shut down or limit the amount of power that energy assets, such as wind turbines or solar panels, can produce.
Cut-in Speed	The windspeed at which a turbine is programmed to start rotating and generating electricity.
Cut-out speed	The windspeed at which a turbine is programmed to slow the speed at which the rotor spins to prevent system failure.
Development Area	The area within the project property(ies) within which the renewable energy project is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints.
Development Footprint	Any evidence of physical alteration as a result of undertaking of any activity associated with the development.

Ecology	The study of the interrelationships of organisms with and within their physical surroundings
Ecosystem	The interconnected assemblage of all living organisms that occupy a given area and the physical environment with which they interact.
Endemic/Endemism	Species unique (native or restricted) to a defined geographic location, i.e. ecological state of a species being unique to a defined geographic location.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Environmental Impact Assessment Report	The report produced to relay the information gathered and assessments undertaken during the Environmental Impact Assessment.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Ephemeral	A water body that does not flow or contain water year-round, in response to seasonal rainfall and run-off.
Fauna	The collective animals of a particular region, habitat or geological period.
Feasibility Study	The determination of the technical and financial viability of a proposed project.
Fossil	Rare objects that are preserved due to unusual circumstances.
Flora	The collective plants of a particular region, habitat or geological period.
Freewheeling	When the turbine blades are rotating but are not connected to the generator i.e. no electricity is generated. This can occur in wind speeds below the cut-in speed of the turbine. Prolonged freewheeling can cause wear and tear on the turbine components.
Geohydrology	The study of the character, source and mode of occurrence of groundwater
Gearbox	A component of a wind turbine that increases the rotational speed of a rotor before transmission to the generator, optimising the generator's efficiency.
Generator	A component of a wind turbine that generates electricity by converting mechanical energy from the rotating shaft into electrical energy
Heritage Resources	Refers to something tangible or intangible, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations and has cultural significance.
Herpetofauna	Amphibians and reptiles of a particular region, habitat or geological period.
Housekeeping	Maintaining the working environment in a tidy manner.

Hydrology	The scientific study of the movement, distribution, and quality of water on Earth, including the water cycle, water resources and environmental watershed sustainability.
Hub	A component of a wind turbine that connects the rotor to the main shaft.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Independent EAP	An independent person with the appropriate qualifications and experience appointed by the Applicant to manage the Environmental Impact Assessment process on behalf of the Applicant.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Mesic	An environment or habitat containing a moderate amount of moisture.
Mitigation cut-in speed	A new cut-in speed programmed higher than the manufacturer's set speed to avoid a specific impact.
Mitigation measures	Design or management measures that are intended to avoid and/or minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Nacelle	A component of a wind turbine that houses critical components such as the gearbox, generator and other electrical controls.
Non-volant Mammals	Mammals that cannot fly.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Preferred Bidder	The Firm/Joint Venture/Consortium that has participated in a Government/Private sector Request for Proposals (RFP) and is notified of its provisional appointment in meeting the requirements set out in the RFP.
Project Area	The total extent of the land parcels on which the Renoster cluster is proposed, and surrounds.
Project Site	The total extent of the land parcels on which the Renoster 1 Wind Farm is proposed.
Resilient System	An ecosystem or habitat that resists damage and recovers quickly.
Rotor	A component of a wind turbine that is attached to a hub to capture kinetic energy produced by wind.
Rotor Swept Area	The circular area is the area through which the rotor blades of a wind turbine spin, as seen when directly facing the centre of the rotor blades
Scoping	A procedure to consult with stakeholders to determine issues and concerns and for determining the extent of and approach to an EIA and EMPr (one of the phases in an EIA and EMPr). This process results in the development of a scope of work for the EIA, EMPr and specialist studies.

Screening Tool	The National Web Based Environmental Screening Tool used to identify environmental sensitivity ratings to a specific identified site for a number of environmental themes.
Sense of Place	The identity of a place related to uniqueness and/or distinctiveness. Sometimes referred to as genius loci meaning 'spirit of the place'.
Specialist study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Stakeholders	All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.
Sustainable development	Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.
Tower	A structure that supports a wind turbine and elevates the rotor to a height where wind speeds are higher and more consistent.
Wake-induced turbulence	The disruption of smooth airflow by other turbines.
Wake loss	The loss of generation capacity of turbines located downstream of mean wind directions due to kinetic energy being extracted by upstream turbines.
Waterbody	A body of water forming a physiographical feature, for example a river.
Watercourse	A natural freshwater feature, including pans.
Wheeling	The delivery of energy from a generator to an end-user located in another area using an existing distribution or transmission network. Wheeling allows privately generated power to be transmitted across the national grid to customers in a willing buyer/ willing seller model. This facilitates renewables-based energy transmission from sites with good wind and solar radiation to corporate, industrial and residential customers located in areas less conducive to renewable energy production.
Wind vane	An instrument that determines wind direction and assist the yaw system to align a wind turbine appropriately.
Yaw system	A system that ensures wind turbine blades are aligned with oncoming wind by turning the turbine into the direction that optimises mean wind speed.

1 Introduction

1.1 Background and Introduction

Red Cap Renoster 1 (Pty) Ltd, Red Cap Renoster 2 (Pty) Ltd and Red Cap Renoster 3 (Pty) Ltd ('Red Cap') propose to develop a wind energy cluster and associated grid connection ('the cluster') at a site (the 'project area') near Edenville in the Free State (Figure 1-1). The cluster is referred to as the 'Renoster Wind Farms Development'. The cluster comprises three Wind Energy Facilities (WEFs), called the Renoster 1 Wind Farm, Renoster 2 Wind Farm and Renoster 3 Wind Farm, each of which will be independently commercially and technically viable, as well as a grid connection collector ring line ('Renoster Grid Connection'). The Renoster Grid Connection will include both 132 kV¹ lines and up to three short 400 kV grid connections which will feed into the existing 400 kV lines that traverse the western portion of the site. The cluster covers a total area of ~ 54 000 ha, with the actual footprint expected to comprise approximately 707 ha (~1.3%) of that total area.

The National Environmental Management Act 107 of 1998 (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) warrant that listed activities require Environmental Authorisation (EA) from the Competent Authority (CA). Scoping and Environmental Impact Reporting processes (S&EIRs, also referred to as EIAs) are required to support applications for EA for the various projects comprising the cluster.

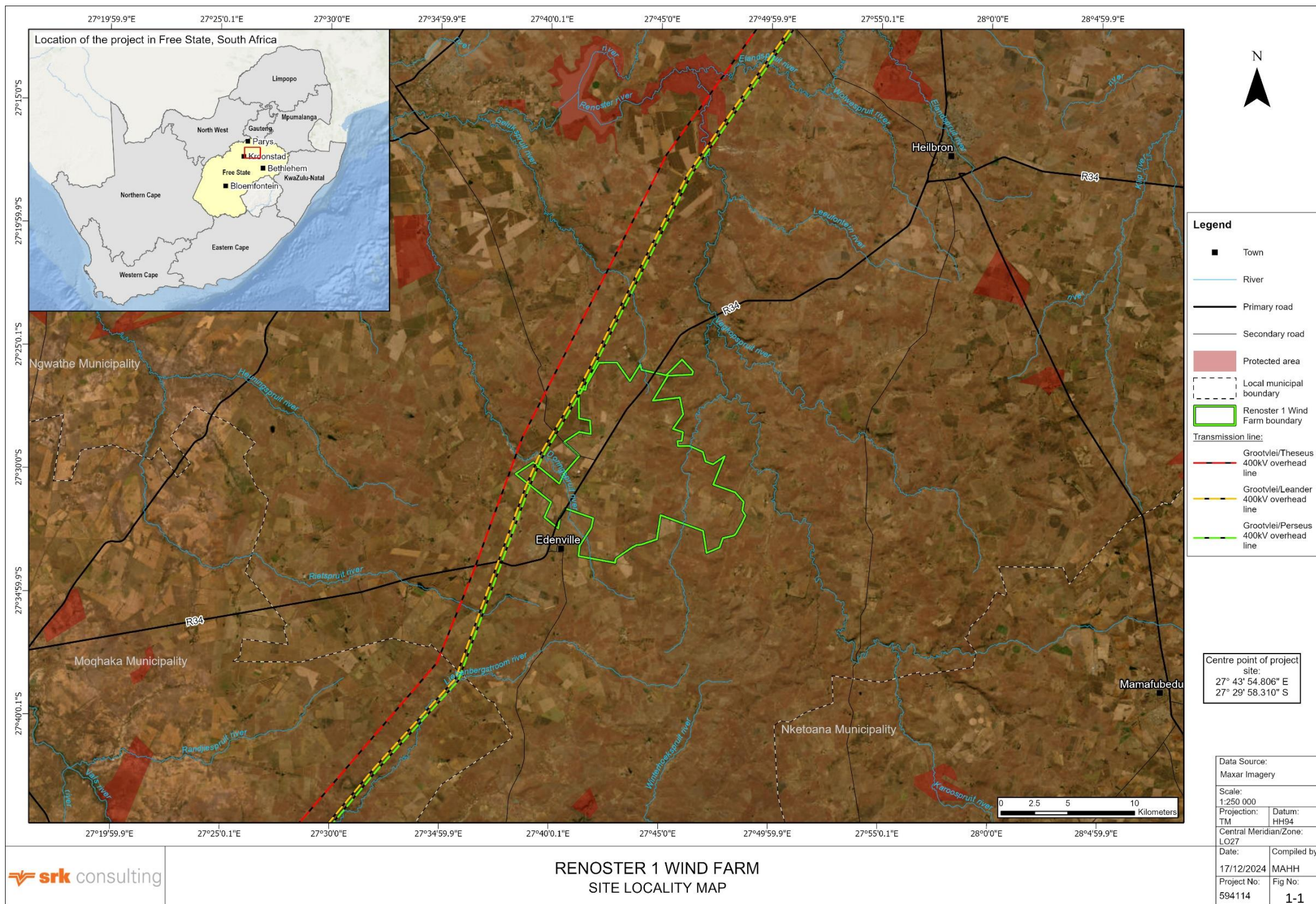
Red Cap intends to participate in the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)². Renewable energy projects that will be submitted as part of the REIPPPP are identified activities in the Integrated Resources Plan 2010-2030 (IRP). According to GN 779 of 2016 (Identification of the Minister as CA for the Consideration of Processing of Environmental Authorisations and Amendments Thereto for Activities Related to the Integrated Resource Plan 2010-2030), the Minister of Environmental Affairs (i.e. the Department of Forestry, Fisheries and the Environment [DFFE]) is the CA for this project. Furthermore, by agreement between the DFFE and provincial authorities, for renewable energy projects that exceed 100 MW in capacity, the Minister of Environmental Affairs (i.e. DFFE) is the CA.

SRK Consulting (South Africa) (Pty) Ltd ('SRK') has been appointed by Red Cap to undertake the environmental processes for the each of the projects comprising the Renoster Wind Farms Development: four separate EAs are sought for the following projects that comprise the cluster (see Figure 1-2), each of which will be subject to a separate S&EIR process:

- Three WEFs (Renoster 1 Wind Farm, Renoster 2 WEF and Renoster 3 Wind Farm) and their associated internal grid connection, comprising internal powerlines, three Battery Energy Storage Facilities (BESSs) and three on-site substations per WEF; and
- Renoster Grid Connection comprising of one grid connection collector ring line corridor, including up to nine Eskom-side switching stations, 132 kV collector powerlines between the switching stations and the collector substations and 400 kV powerlines Looping in and Looping out from the collector substations into one or more of three 400 kV transmission lines that run through the western portion of the cluster.

¹ Powerlines in this report typically have a maximum capacity of up to 66 kV, 132 kV or 400 kV, but in this report are referred to as 66 kV, 132 kV or 400 kV powerlines.

² *The REIPPPP is a South African government initiative aimed at increasing electricity capacity through private sector investment in renewable energy developments.*



Path: Y:\594114 Renoster Wind Farm GIS\8GIS\GISPROJ\PRO\594114_Renoster_Wind_Farm\594114_Renoster_Wind_Farm.aprx

Figure 1-1: Renoster 1 Wind Farm site locality

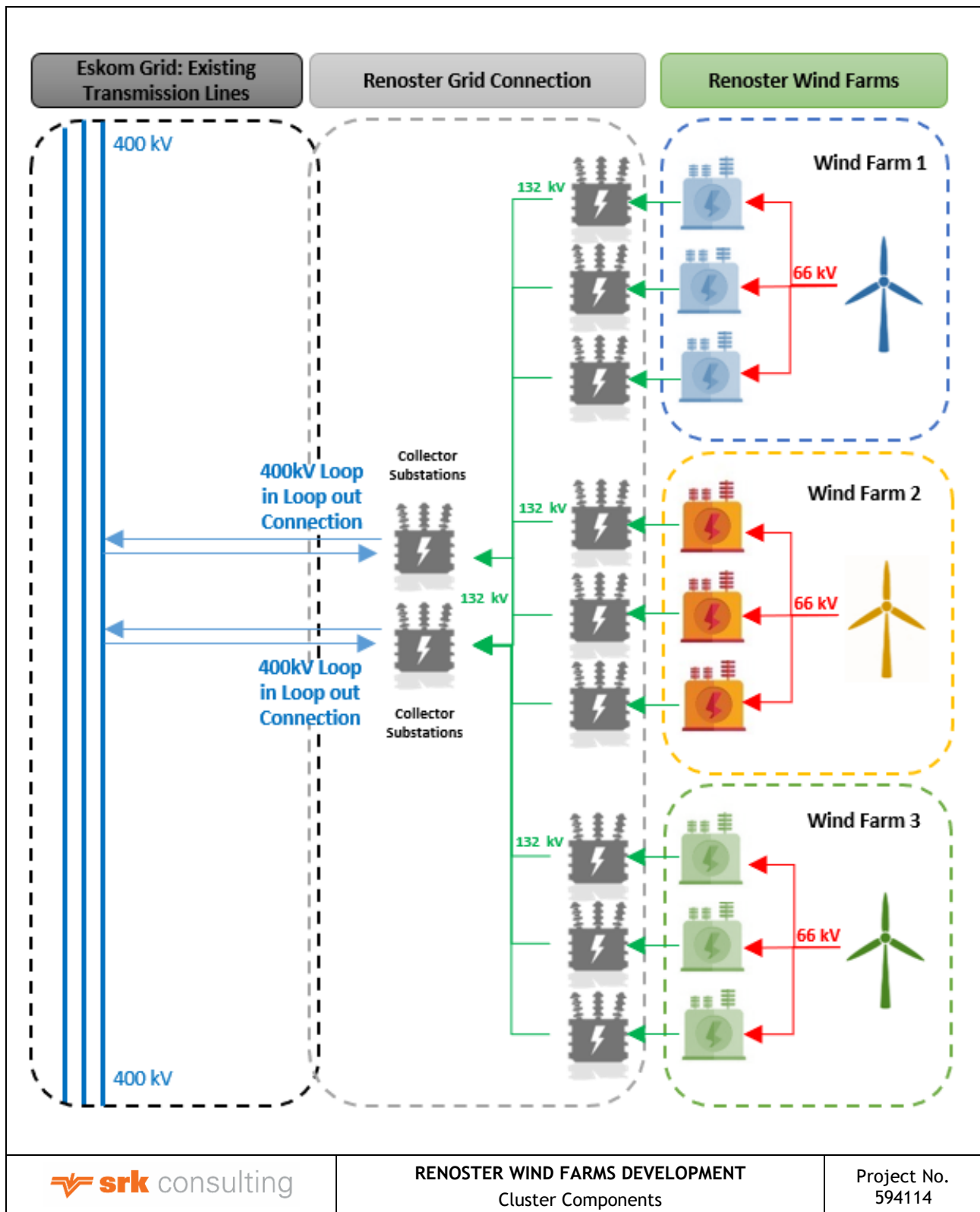


Figure 1-2: Renoster Wind Farms Development cluster components

This Final Scoping Report relates to the Renoster 1 Wind Farm Project and associated internal grid infrastructure ('the project'). The applicant for the Renoster 1 Wind Farm Project is Red Cap Renoster 1 (Pty) Ltd.

1.2 Scope of Work

Red Cap requires that an EIA process be conducted, and the associated reports produced and submitted to the CA (in this case DFFE), to inform DFFE's decision whether to issue the necessary EA for the project. In broad terms, the Scope of Work (SoW) for this EIA process for the Renoster 1 Wind Farm Project includes:

- Conducting an S&EIR process compliant with the EIA Regulations, 2014 for the project;
- Submitting applications through the EIA process for:
 - EA in terms of NEMA; and
 - Heritage approval in terms of the National Heritage Resources Act 25 of 1999 (NHRA);
- Conducting the associated stakeholder engagement (public participation) process, including consultation with relevant authorities, in compliance with the requirements of the EIA Regulations, 2014 and other applicable legislation; and
- Compiling Environmental Management Programmes (EMPrs) for the project.

1.3 Purpose of the Report

The EIA Regulations, 2014 stipulate that the objectives of Scoping are, through a consultative process, to:

- Identify the policies and legislation relevant to the project;
- Motivate the need and desirability of the proposed project, including the need and desirability of the project in the context of the preferred location;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks (inclusive of identification of cumulative impacts) and an evaluation of alternatives considered based on geographical, physical, biological, social, economic and cultural aspects;
- Identify the key issues to be addressed in the Impact Assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the site through the life of the activity, including the nature, significant, consequence, extent, duration and probability of the impacts; and
- Identify 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.

This *Final* Scoping Report is intended to guide the EIA process and specialist studies by:

- Providing an overview of the legal requirements with regard to the proposed project, the baseline environment, the proposed project description and anticipated environmental and social issues and impacts associated with the proposed project;
- Presenting a detailed - albeit preliminary – assessment of anticipated environmental and social issues and impacts associated with the proposed project; and
- Confirming the scope of the EIA process and the Terms of Reference (ToR) for specialist studies and outlining the approach and methodologies to be used in the EIA process.

This report will be submitted to DFFE for their acceptance.

1.4 Structure of this Report

This report describes the proposed activity and its context, details the stakeholder engagement process, presents the results of the Scoping Phase and sets out the Plan of Study for the Impact Assessment Phase. The report has been prepared in accordance with Section 21 of the EIA Regulations, 2014³ and consists of the following sections:

Section 1: Introduction

Provides an introduction and background to the proposed project and outlines the purpose of this document and the assumptions and limitation applicable to the study.

Section 2: Project Description

Describes the project and current status of the site and provides a brief summary of the surrounding land uses as well as background to and a motivation for the proposed project.

Section 3: Governance Framework

Provides a brief summary and interpretation of the relevant legislation as well as pertinent strategic planning documents.

Section 4: Environmental Process

Outlines the approach to the environmental process and provides a summary of work completed to date. Presents the methodology adopted to assess the potential impacts, identifies the specialist studies that are being undertaken and presents the ToR for these studies.

Section 5: Stakeholder Engagement

Details the stakeholder engagement activities conducted in the Pre-Application Phase, *the Scoping Phase* and planned for the *EIA Phase*.

Section 6: Description of the Affected Environment

Briefly describes the biophysical and socio-economic characteristics of the affected environment that are considered in the assessment of potential project impacts.

Section 7: Environmental and Social Impact Assessment

Identifies and assesses the potential impacts associated with the proposed project based on the preliminary layout and presents mitigation strategies. These will be revisited during the Impact Assessment Phase.

Section 8: Plan of Study for the EIA

Presents the proposed approach to the Impact Assessment Phase, outlines the methodology and scope of the Cumulative Impact Assessment (CIA); describes and motivates the need and desirability of the project *vis-a-vis* relevant plans, and socio-economic and ecological factors.

Section 9: Conclusions

Summarises the key findings of the Scoping Phase and outlines the way forward in the Impact Assessment Phase.

³ The report is also structured to meet Red Cap's corporate reporting requirements, notably by (early) assessment of impacts based on the preliminary layout, rather than only outlining a Plan of Study indicating how impacts will be assessed in the Impact Assessment Phase, as is typical of "standard" Scoping Reports.

1.5 Content of Report

Appendix 2 of the EIA Regulations, 2014 (GN R982, which came into effect on 8 December 2014, as amended most recently by GN R517 of 2021), prescribes the required content in a Scoping Report. These requirements and the sections of this Scoping Report in which they have been addressed, are summarised in Table 1-1.

Table 1-1: Required Contents of a Scoping Report

GN 982, App 2 Ref.:	Requirement	Section Ref.:
(2) (a)	Details of:	
(2) (a) (i)	The EAP who prepared the report	p ii
(2) (a) (ii)	The expertise of the EAP, including a curriculum vitae	Appendix A
(2) (b)	Location of the activity, including:	1.1
(2) (b) (i)	21 digit Surveyor General code of each cadastral land parcel	Appendix B
(2) (b) (ii)	Physical address and farm name (where available)	Appendix B
(2) (b) (iii)	Where (2) (b) (i) and (2) (b) (ii) are not available, the coordinates of the boundary of the property/ properties	N/A
(2) (c)	A plan indicating the location of the proposed activity/ activities and associated infrastructure, or:	1.1
(2) (c) (i)	For linear activities, a description and coordinates of the corridor in which the proposed activity/ activities is to be undertaken	
(2) (c) (ii)	On land where the property has not been defined, the coordinates within which the activity is to be undertaken	N/A
(2) (d)	A description of the scope of the proposed activity, including:	
(2) (d) (i)	All listed and specified activities triggered	3.1.1.1
(2) (d) (ii)	A description of activities to be undertaken, including associated infrastructure	2
(2) (e)	A description of the policy and legislative context	3
(2) (f)	Motivation for need and desirability for the proposed development	2.5
(2) (g)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:	
(2) (g) (i)	Details of all alternatives considered	2.6
(2) (g) (ii)	Details of public participation process undertaken, including copies of the supporting documents and inputs	5
(2) (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	5.3
(2) (g) (iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	2.6
(2) (g) (v)	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	7.1.1
(2) (g) (vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks	7.2
(2) (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	7.5 - 7.18

GN 982, App 2 Ref.:	Requirement	Section Ref.:
(2) (g) (viii)	Possible mitigation measures that could be applied and level of residual risk	7.5 - 7.18
(2) (g) (ix)	Outcome of the site selection matrix	N/A
(2) (g) (x)	If no alternative development locations for the activity were investigated, the motivation for not considering such	2.6.1
(2) (g) (xi)	A concluding statement indicating the preferred alternative development location within the approved site	2.6.2 and 9.1
(2) (h)	A plan of study for the EIA, including:	
(2) (h)	A description of the alternatives to be considered and assessed including the option of not proceeding	2.6.4, 2.6, 9.1
(2) (h) (ii)	A description of the aspects to be assessed as part of the environmental impact assessment process	7.1.1
(2) (h) (iii)	Aspects to be assessed by specialists	4.1.4.2
(2) (h) (iv)	A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists.	4.1, 4.1.4.2, 7.2
(2) (h) (v)	A description of the proposed method of assessing duration and significance	
(2) (h) (vi)	An indication of the stages at which the CA will be consulted	
(2) (h) (vii)	Particulars of the public participation process that will be conducted during the environmental impact assessment process	8.7
(2) (h) (viii)	A description of the tasks that will be undertaken as part of the environmental impact assessment process	8
(2) (h) (x)	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	7.5 - 7.18
(2) (i)	Undertaking under oath or affirmation by the EAP in relation to:	p iii
(2) (i) (i)	The correctness of the information provided in the report	
(2) (i) (ii)	The inclusion of comments and inputs from stakeholders and interested and affected parties	
(2) (i) (iii)	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	
(2) (j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment	p iii
(2) (j)	Any specific information required by the CA	<u>1.1</u> <u>Table 2-3</u> <u>8.3</u> <u>8.3.3</u> <u>Appendix G</u>

1.6 Assumptions and Limitations

As is standard practice, this Scoping Report is based on a number of assumptions and is subject to certain limitations. These are as follows:

- It is assumed that information provided by Red Cap, other consultants and specialists is accurate;
- SRK's assessment of the significance of impacts of the proposed development on the affected environment is based on the activities described in Section 2.3.2 and presented in the preliminary

layout. Any substantial changes to the project description and layout will require impacts to be reassessed in the Impact Assessment Phase;

- Where detailed design information is not available, the precautionary principle, i.e. a conservative approach that overstates negative impacts and understates benefits, has been adopted;
- It is assumed that the stakeholder engagement process undertaken during the S&EIR process to date has identified relevant concerns of stakeholders;
- Red Cap Renoster 1 (Pty) Ltd will in good faith implement the agreed mitigation measures identified in this report. To this end it is assumed that Red Cap Renoster 1 (Pty) Ltd will commit sufficient resources and employ suitably qualified personnel; and
- Definitive assessment of the potential positive and negative environmental impacts of the proposed development will only be undertaken during the Impact Assessment Phase.

Limitations and assumptions applicable to specific specialist studies are listed in the respective specialist reports. Notwithstanding the above, SRK is confident that these assumptions and limitations do not compromise the overall findings of the report.

2 Project Description

The project design information in this chapter reflects the information available at the time of the compilation of the Scoping Report and is deemed sufficiently detailed for the purposes of the EIA process. However, it is expected that the findings of the preliminary specialist impact assessments included in this Scoping Report will influence the layout of the proposed project and as such, it is likely that the project description will evolve and be refined during the final stages of the EIA process.

2.1 Wind Energy Facilities: An Introduction

A WEF, more commonly known as a wind farm or wind power plant, is a large-scale wind power system. WEFs harness kinetic energy produced by wind and convert it into electricity, supplying power to utilities (e.g. Eskom), or directly to large private or public off-takers (e.g. industrial or municipal customers) or “wheeled” via Eskom to private off-takers. WEFs are best located in areas associated with high wind speeds, and proximity to existing grid infrastructure is also advantageous.

WEFs comprise a number of components, including wind turbines, transformers, substations, BESSs and ancillary infrastructure such as roads, on-site cabling and low voltage powerlines and administrative offices. WEFs must also connect to grid infrastructure, via switching stations, collector substations and transmission lines.

Each wind turbine comprises the components summarised in Table 2-1 and illustrated in Figure 2-1 below.

Table 2-1: Wind turbine components and their functions

Component	Function
Blades	Catch wind and convert its energy to rotational motion.
Rotor	Rotate the blades attached to a hub to capture kinetic energy produced by wind.
Gearbox	Increase rotational speed of the rotor before transmission to the generator, optimising the generator's efficiency.
Nacelle	House critical components such as the gearbox, generator and other electronic controls.
Tower	Support the wind turbine and elevate the rotor to heights where wind speeds are higher and more consistent.
Hub	Connect the rotor to the main shaft.
Generator	Generate electricity by converting mechanical energy from the rotating shaft into electrical energy.
Controls and monitoring system	Track wind speed, direction and turbine performance and adjust the blade pitch to optimise electricity generation while ensuring safe operation.
Yaw system	Ensure the blades are aligned with oncoming wind by turning the turbine into the direction of the optimal mean wind speed.
Anemometer	Measure wind speed and provide data for the turbine control system.
Wind vane	Determine wind direction and assist the yaw system to align the turbine appropriately.

Source: (Windmills Tech, 2024)

To generate electricity, the rotor spins a shaft connected to an assembly of magnets housed inside the nacelle, generating voltage in a wire coil and producing alternating current (AC). The tower supports the rotor and nacelle and provides adequate ground clearance for rotor blades to safely rotate and capitalise on wind resources.

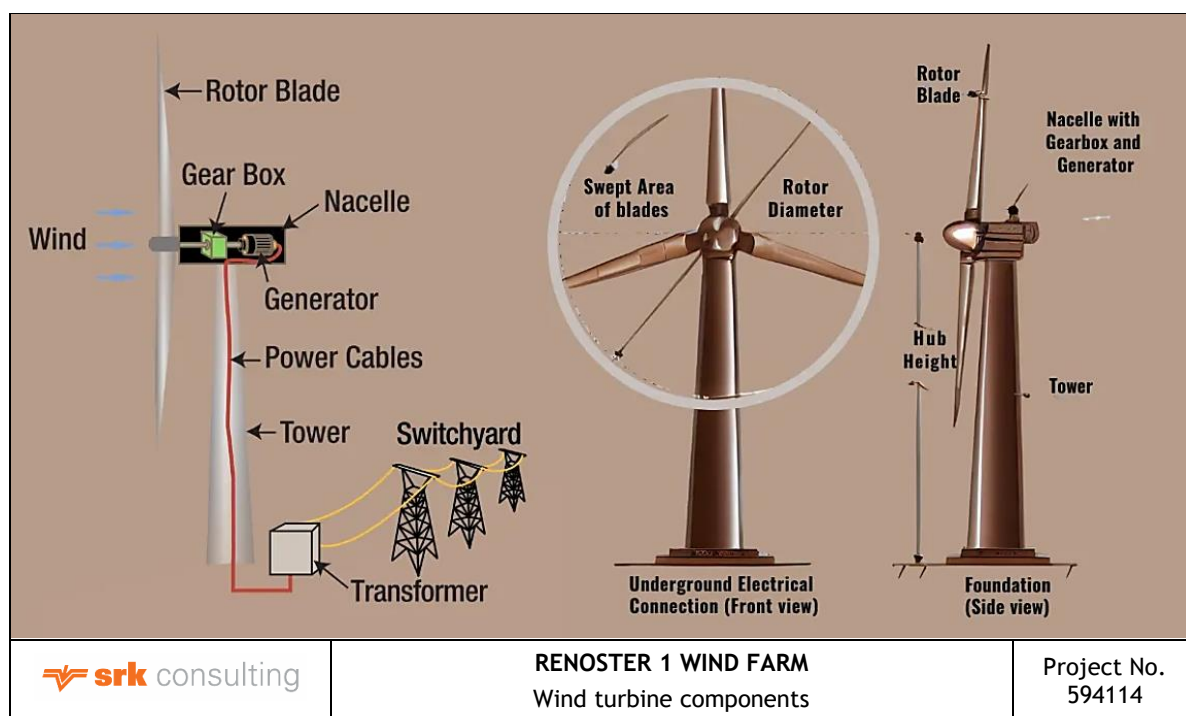


Figure 2-1: Wind turbine components

Source: (Windmills Tech, 2024)

Once kinetic energy is converted into electricity, voltage is increased (stepped up) to up to 66kV using a transformer so that it can be transmitted to a substation using medium voltage cables. The substation steps up the voltage to >132 kV and evacuates power to a collector substation (also referred to as a Main Transmission Station - MTS) and the national grid, or directly to a private or public off-taker (REPSOL, 2024). A schematic depicting a WEF and its onward evacuation of power is presented in Figure 2-2.

Wind turbines require a minimum windspeed to generate usable electricity – the ‘cut-in’ speed. Typically, the cut-in speed is approximately 3.5 m/s (10 – 15 km/h) but depends on the specific turbine type. Conversely, wind speeds exceeding a certain high wind speed the ‘cut-out’ speed – may cause wind turbines to mechanically fail and are deemed a safety hazard. To prevent failure of the system, wind turbines are equipped with speed and pitch control systems that automatically activate when the cut-out speed is breached. When activated, the speed and pitch control systems slow the speed at which the rotor spins using brake force and turn the rotor away from the prevailing wind direction.

The performance of a WEF depends on climatic conditions (primarily wind and temperature; temperatures between 20 – 50° C are optimal), wind turbine specifications and capacity and system configuration. The ideal WEF layout considers wake losses⁴ and wake-induced turbulence⁵. To mitigate these factors, turbines are ideally placed in a staggered layout, with each row at varying heights (i.e. two rows of turbines are never positioned directly behind each other or at the same height) (Wesselink, 2022).

⁴ The loss of generation capacity of turbines located downstream of mean wind directions due to kinetic energy being extracted by upstream turbines.

⁵ The disruption of smooth airflow by other turbines.

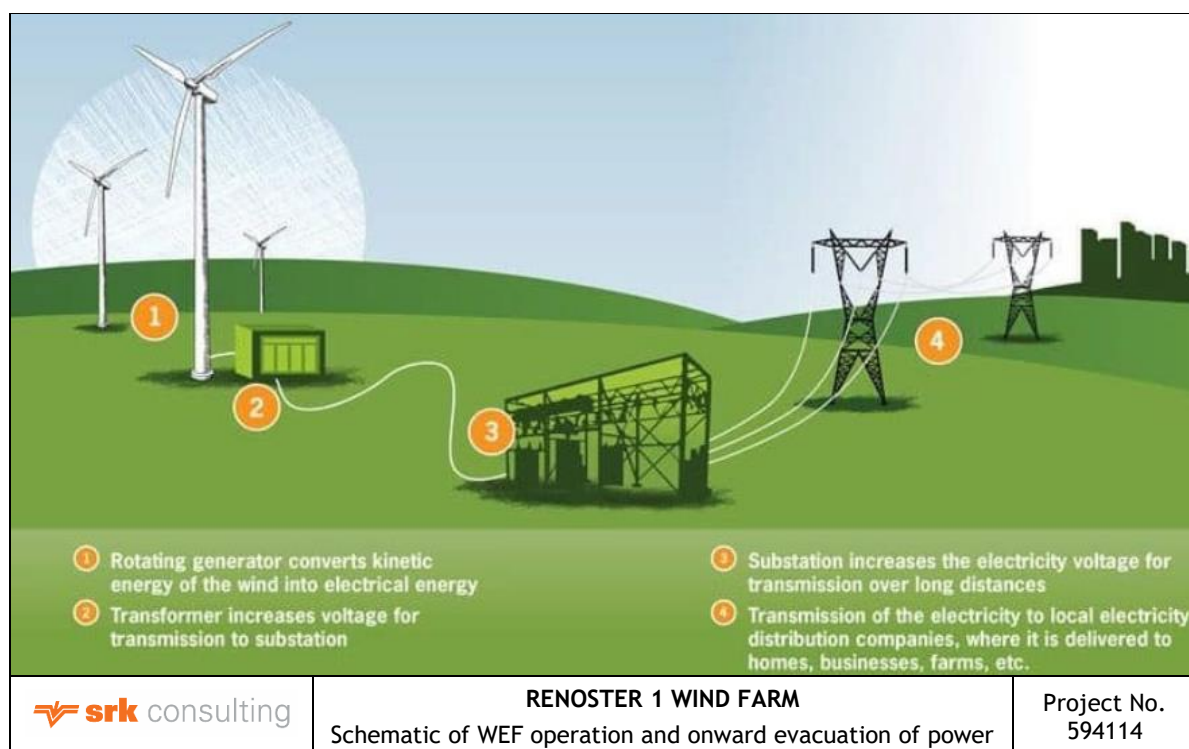


Figure 2-2: Schematic of WEF operation and onward evacuation of power

Source: (Hamilton, 2017)

Wind turbines typically operate independently and continuously for a period of ~20 years with little maintenance required. Once operating, they can be monitored and controlled remotely, with mobile maintenance teams deployed if necessary.

2.2 Regional Renewable Energy Sector

South Africa experiences above average wind speeds in most land areas of the country, compared with other countries that are more advanced in the development and implementation of wind energy projects (Figure 2-3).

No wind projects were awarded Preferred Bidder status in the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Bid Window 6 in 2022 or Bid Window 7 in 2024. Issues of grid capacity have constrained the connection of new projects to the grid (Slater, 2023), specifically in the Cape Provinces. While the latest Integrated Resource Plan (IRP - dated 2023 and released in 2024 for comment) makes limited reference to renewable energy, it does note that renewables provide an opportunity to diversify the electricity mix and create new industries across the value chain. The previous version, the 2019 IRP, stipulated that 1 600 MW of new wind power be procured every year, from 2022 to 2030. However, the Global Wind Energy Council urges world leaders and parties who committed to the Paris Agreement to triple the installed capacity of wind energy, which, in South Africa, equates to the addition of 5 000 MW a year (Slater, 2023).

While a number of solar projects have been pursued in the Free State, the Renoster Wind Farms Development is one of the first wind projects in the province (Figure 2-4). According to the DFFE Renewable Energy Environmental Authorisation database, there are no other renewables projects within 30 km of the Renoster cluster; however, there are eight approved Solar Energy Facilities (SEF) and three more in process within 50 km of the Renoster cluster (Table 2-2 and Figure 2-6).

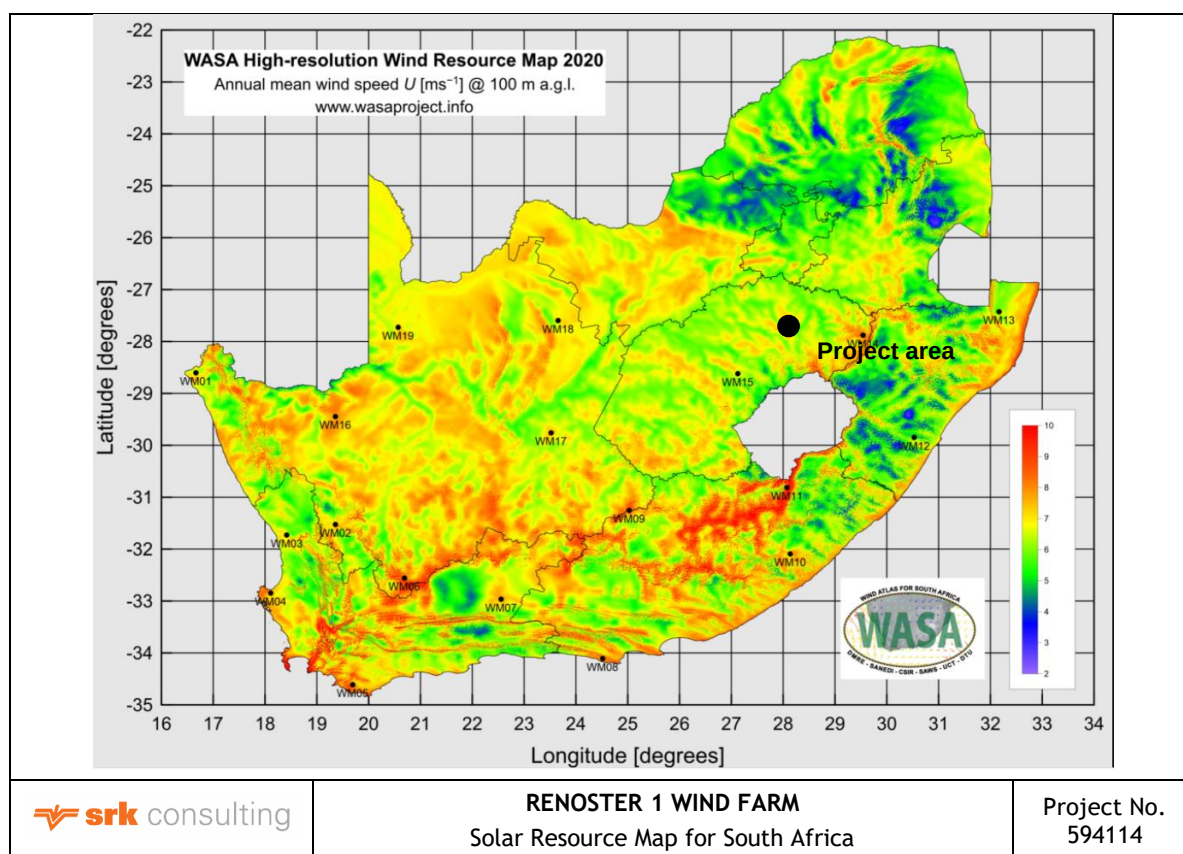


Figure 2-3: Wind atlas for South Africa

Source: (WASA, 2020)

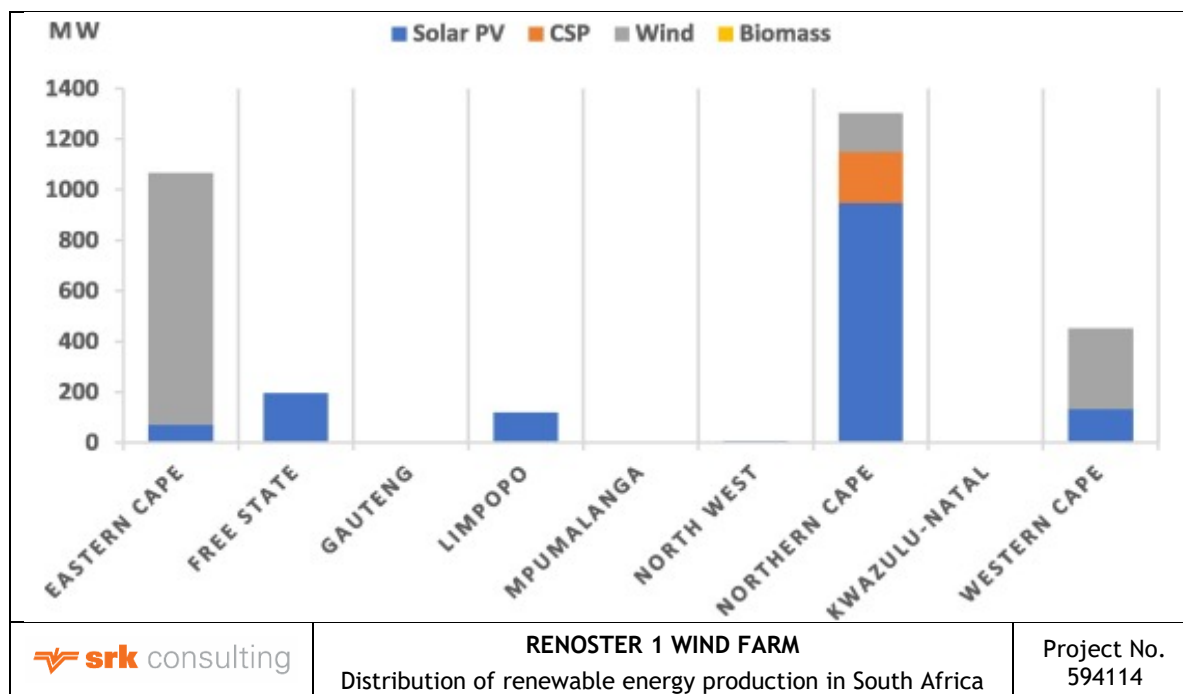


Figure 2-4: Distribution of renewable energy production in South Africa (2020)

Source: (Akinbami, Oke, & Bodunrin, 2021)

Table 2-2: Renewable energy projects under consideration or approved within 50 km of the project area (Quarter 3 2024)

Project	DFFE Reference	Capacity (MW)	EA Status
Bonsmara SEF	14/12/16/3/3/2/2228	100	Approved
Oslaagte Solar 3 Photovoltaic Project	14/12/16/3/3/2/2306	480	Approved
Mooivlei Solar 1 Photovoltaic Project	14/12/16/3/3/2/2307	240	Approved
Mooivlei Solar 2 Photovoltaic Project	14/12/16/3/3/2/2308	240	Approved
Vrede Photovoltaic SEF	14/12/16/3/3/2/2038	100	Approved
Heuningspuit PV 1 SEF	14/12/16/3/3/1/1083	5	In process
Heuningspuit PV2 SEF	14/12/16/3/3/1/1084	5	In process
Steynrus SEF PV1	14/12/16/3/3/1/798	5	In process
Steynrus SEF PV1	14/12/16/3/3/1/798/1	100	Approved
Teshe 100MW Rondavel photovoltaic SEF	14/12/16/3/3/2/2039	120	Approved
Oslaagte Solar 1 Photovoltaic Project	14/12/16/3/3/2/2302	460	Approved
Leeuwspruit Solar 2 Photovoltaic Project	14/12/16/3/3/2/2305	240	Approved

Source: (DFFE, 2024)

2.3 Project Overview

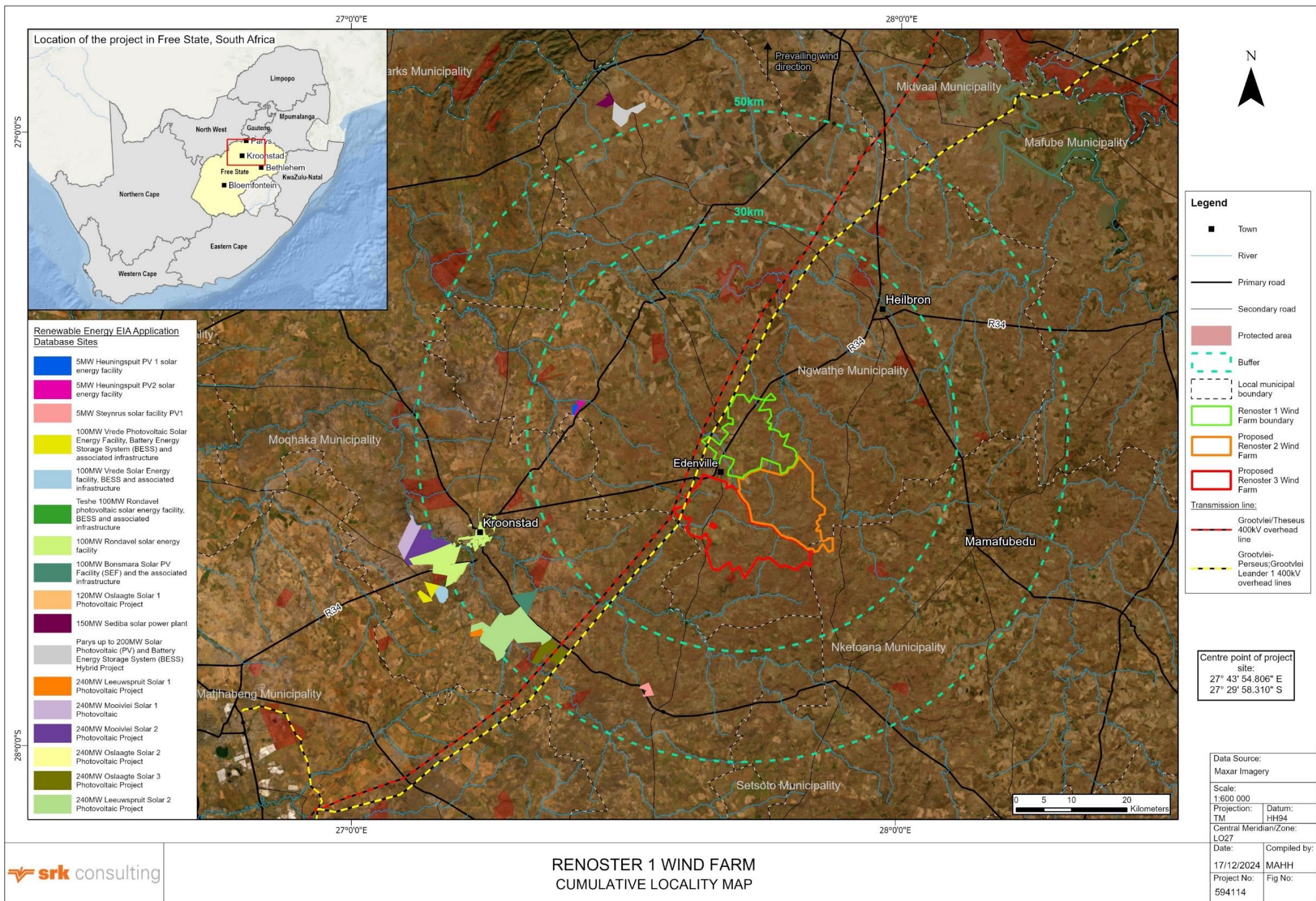
2.3.1 Renoster Wind Farms Development

The Renoster Wind Farms Development comprises three WEFs and a grid connection collector ring line and associated infrastructure servicing the three WEFs (Figure 1-2). It is anticipated that each WEF will have a nameplate generation capacity of at least 240 MW.

The cluster is located near Edenville in the Free State, predominantly within the Ngwathe Local Municipality (LM), in the Fezile Dabi District Municipality (FDDM), with a small portion in the south-east located in the Nketoana LM and Thabo Mofutsanyane DM (TMDM) (see Figure 1-1).

The cluster is not situated in a Renewable Energy Development Zone (REDZ) nor a Strategic Transmission Corridor (STC). However, three 400 kV transmission lines run through the western portion of the cluster, providing direct access to the national grid.

The total cluster area is ~54 000 ha (Figure 1-1) with a total permanent footprint of ~707 ha, which comprises ~1.3% of the total area. This provides substantial opportunity to optimise the layout such that environmental and social considerations are carefully incorporated into the design and layout. Red Cap achieved this by commissioning a detailed, multi-disciplinary Screening exercise prior to commencement of the formal EIA process.



Path: Y:\594114 Renoster Wind Farm GIS\GIS\GISPROJ\PROJ\594114_Renoster_Wind_Farm\594114_Renoster_Wind_Farm.aprx

Figure 2-5: Renewable Energy Projects within a 30 km and 50 km radius of the Renoster Wind Farms Project (based on DFFE Q3 2024 data)

2.3.2 Renoster 1 Wind Farm

The Renoster 1 Wind Farm ('the project') requires several key components to facilitate the generation of electricity at a large scale. This includes:

- Wind turbines – a maximum of 69 turbines are being considered for the site;
- Roads;
- Underground cables and overhead medium voltage powerlines (up to 66 kV);
- Substations;
- BESSs; and
- Operations and Maintenance (O&M) area for control, operation, plus workshop and storage buildings/areas).

Specifications for each component are set out in Table 2-3. Total footprints including temporary areas necessary for construction are also included in this table. The preliminary layout, which has been assessed by specialists, is presented in Figure 2-7.

2.4 Description of the Project Area

2.4.1 Site Description

The Renoster 1 Wind Farm site ('the project site' or 'the site') is located in the northern portion of the cluster and is entirely located within the Ngwathe LM. The town of Edenville lies immediately to the south-west of the site. The R34 traverses the site in a SW-NE direction and three 400 kV powerlines intersect the north-western portion of the site.

The site mainly comprises low, undulating hills with a few rocky outcrops mainly situated in the north-east of the site. Just over half the site has been transformed. The majority of the intact vegetation remnants of the site consists of Central Free State Grassland (*Least Concern*) with some Vaal-Vet Sandy Grassland (*Endangered*) present in the west of the site. The site is drained by the Renoster River and its tributary, the Doringspruit River. The Renoster River joins the Vaal River east of the site. Overall, the Renoster 1 Wind Farm site characteristics are typical of the wider area and there are no exceptional or rare features present within the site that are not also represented more broadly in the landscape.

The site encompasses 56 farm properties and portions. These are listed in Appendix B.

Table 2-3: Overview of Renoster 1 Wind Farm specifications

Project Components	Description	Total Dimensions
Location	Central coordinates:	27° 43' 54.806" E 27° 29' 58.310" S
Extent	The total area of the site being considered for developing the wind farm	13 061 ha
Access	The site can be accessed from the main urban areas in the region via the well-established existing road network in the area: - From Kroonstad, 50 km to the west, the site can be accessed from the R34; - From Heilbron, 50 km to the north east, the site can be accessed from the R34; and - From Mamafubedu (Petrus Steyn), 50 km to the east, the site can be accessed from the S-66.	
Site roads	Permanent roads will be 8 m wide and over above this may require side drains up to 2m wide on one or both sides depending on the topography. Many (most) roads will have underground cables running next to them. An up to 20 m wide road corridor may be impacted during construction and partly rehabilitated to retain a permanent 8 m road surface with 2 m drain after construction and underground cabling. This total road network also includes upgrades to sections of public roads This total road network also includes shared road infrastructure with the other wind farms in the cluster	103.5 ha (permanent) 103.5 ha (temporary) 30.1 km <i>Total length to be determined and assessed in the Impact Assessment Phase</i>
Number of wind turbines and generation capacity	Up to a maximum of 69 wind turbines will be developed. The minimum generation capacity for each wind turbine is 4 MW <i>and the maximum capacity of each turbine is 15 MW. The minimum capacity of the WEF is 240 MW. In theory, the maximum capacity of the WEF is 1 035 MW (15 MW x 69 turbines), but this will not be achieved because turbines of larger capacity require greater spacing between them, meaning that not all approved turbine positions would be utilised.</i>	69
Wind turbine specifications	- Rotor diameter: up to 240 m (120 m blade/radius); - Hub height: up to 200 m; - Rotor top tip height: up to 320 m (maximum based on 200 m hub + 120 m blade); and - Rotor bottom tip height: minimum of 20 m (and not lower).	-
Turbine foundations and crane pad	Each turbine will have a circular foundation with a diameter of up to 32 m, within a permanent crane pad with a maximum footprint of 65 m x 70 m (4 550 m²).	32 ha (permanent)

Project Components	Description	Total Dimensions
Turbine hardstand areas	A temporary crane boom assembly area with a maximum footprint of 3 700 m ² and a temporary blade laydown area with a maximum footprint of 2 400 m ² will also be required at each turbine hardstand. Allowance is also made for an additional temporary embankment area with a footprint of 600 m ² next to the blade laydown area, where required, due to slopes.	46.2 ha (temporary)
Temporary areas required for the Construction/Decommissioning Phase	The wind farm will require the following temporary construction areas: • Temporary site camp/s areas of ~20 000 m²; • Batching plant area of ~10 000 m²; • General laydown area of ~36 000 m²; and • Bunded fuel and lubricants storage facility at the site camp (storing less than 80 m³ of dangerous goods). Individual turbine temporary laydown areas including crane boom laydown areas, blade laydown areas and other potential temporary areas are detailed above under "turbine hardstands".	6.6 ha (temporary)
Concrete tower assembly yard	Provision has been made for a 6.5 ha concrete tower pre-assembly and storage yard should concrete towers be selected over steel towers.	6.5 ha
Cabling	Turbines will be connected to an on-site substation by >66 kV cables. Cables will be laid underground in trenches mainly adjacent to proposed wind farm roads or existing roads but in some instances will deviate from the roads. Where feasible, cables have been routed along existing local roads. Cables running next to public roads may not be installed within the road reserve, but as close as possible to the road reserve in the adjacent private owned land.	9.5 km 5.7 ha (temporary) 4 km 2.4 ha (temporary)
Internal wind farm overhead powerlines	In a few instances, >66 kV powerlines supported by overhead monopoles, wooden poles or steel or wooden lattice structure pylons up to 32 m high will be used where trenching of the cables is not viable. Tracks will be required to access the pylons.	<i>Total length to be determined and assessed in the Impact Assessment Phase</i>
	Where possible, to reduce areas of new impact, sections of overhead line have been routed next to proposed Eskom overhead lines.	<i>Total length to be determined and assessed in the Impact Assessment Phase</i>
Wind farm Substations	The wind farm will have up to three substations, each with a yard of 150 m x 75 m in extent. Substations will include an O&M building, Substation building and a High Voltage Gantry. The area for the substation yards is as follows:	3.4 ha (permanent)
Battery energy storage systems (BESSs)	The wind farm will also have up to three BESSs, each occupying an area of ~3.5 ha which may be adjacent or slightly removed from the three substations depending on local site constraints.	10.5 ha (permanent)

Project Components	Description	Total Dimensions
	Each BESS will be connected to the wind farm substation by an underground or overhead cable or may require its own substation which would be located within the BESS footprint and would be connected directly to the Eskom switching station via a short 132 kV overhead line.	
Operation and maintenance (O&M) areas	The O&M areas will include offices, stores, workshops and laydown areas.	Included in the substation yards
Security	Security gates and huts will be installed at the (projected) four main entrances to the wind farm site (each 20 m ²). Fencing will not be established around individual turbines; however, existing fencing shall be retained around the perimeter of properties. Temporary and permanent yard areas will be enclosed (with access control) with an up to 2.4 m high fence.	80 m ²
Total disturbance footprint		171 ha temporary 149 ha permanent

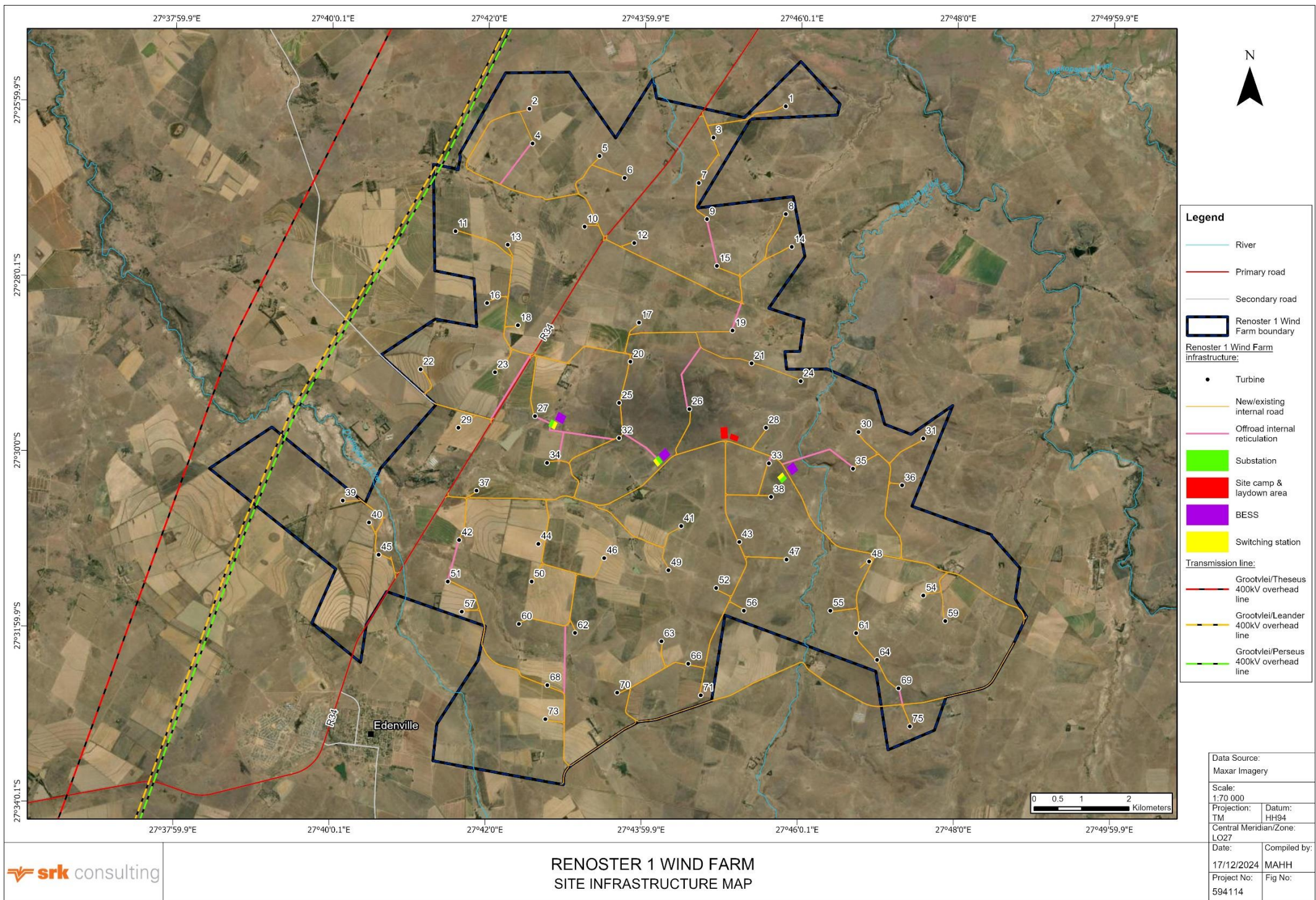


Figure 2-7: Renoster 1 Wind Farm preliminary layout

2.4.2 Surrounding land use

Apart from the nodes of urban development (Edenville/Ngwathe abutting the cluster in the north west portion of the site, Kroonstad ~ 40 km to the west, Heilbron ~ 25 km and Mamafubedu ~35 km to the south-east), the area largely comprises extensive farms, a few guesthouses and lodges, a network of gravel farm roads, and the R34 regional road. Farming in the region comprises maize, soya and sunflower crops in the western portions of the project area, while the central and eastern portions of the project area are predominantly utilised for livestock farming (for the most part Bonsmara and Limousin cattle and some merino sheep) (Geoss, 2024).

2.5 Proponent's Project Motivation

2.5.1 Motivation for Renewable Energy Generation in South Africa

2.5.1.1 Increased Renewable Power Generation to Meet Growing Demand and Facilitate Economic Growth

Eskom expects to retire 10 000 MW of installed thermal power generation capacity by 2030 and needs to add 40 000 to 50 000 MW of new capacity by 2037 to replace retired units and provide for South Africa's existing and growing energy demand and thereby facilitating economic growth (Business Day, 2022) (and see Section 3.2.1). Installing alternative power sources as part of the energy mix will be critical.

South Africa has already been forced to implement periodic loadshedding due to insufficient power production in nine of the 16 years between 2007 and 2022 (see Figure 2-8). Loadshedding has continued into 2024, though reduced, then ceased in the second half of the year. Loadshedding in 2023 was double the loadshedding in 2022 and almost ten times more than in 2021 (Business Tech, 2024). Loadshedding is a result of declining electricity production (see Figure 2-8), only marginally offset by increased renewable energy production (see Figure 2-9). However, Figure 2-8 and Figure 2-9 illustrate that renewable energy, which can be commissioned comparatively quickly, has an important role to play in addressing South Africa's energy shortage. However, it is acknowledged that energy demand and supply are highly complex, and that WEFs are not on-demand facilities that always produce a predictable, dispatchable power output (installation of BESS facilities will increase the reliability of energy supply from the project).

The REIPPPP was established at the end of 2010 as one of the South African Government's urgent interventions to enhance electrical power generation capacity in the country. Administered by the (former⁶) Department of Mineral Resources and Energy (DMRE) the programme seeks to secure electricity from renewable and non-renewable energy sources, via private sector investment, whilst contributing to broader national development objectives (DMRE, 2021). In July 2022, DMRE announced a doubling of the originally anticipated generation capacity procured through Bid Window 6 (Hall, 2022). However, DMRE only awarded 860 MW of the 4 200 MW that was bid (DMRE, 2022), with none of the WEF projects being selected as Preferred Bidders due to lack of Eskom grid capacity (Engineering News, 2024a). The Request for Proposal for Bid Window 7, released in December 2023, invited bids for 3 200 MW for onshore wind (WEFs) and 1 800 MW for Solar Photovoltaic (SEFs)

⁶ Following the May 2024 elections and the formation of the Government of National Unity, the DMRE was restructured as the Department of Minerals and Petroleum Resources and the energy portfolio has been incorporated into the Department of Electricity and Energy. However, at the time of compilation of this report, government department websites and resources have not been updated to reflect these changes.

(DMRE, 2024). Once again, none of the WEF projects were selected as Preferred Bidders in December 2024, mainly due to lack of Eskom grid capacity.

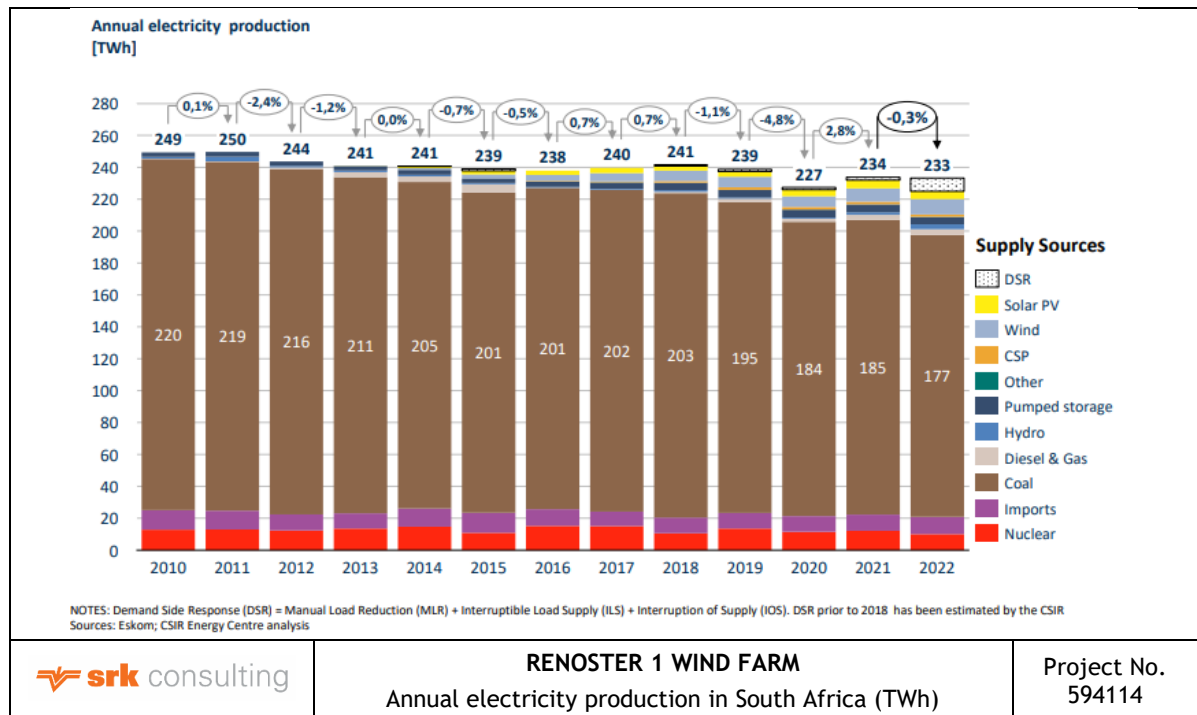


Figure 2-8: Annual electricity production in South Africa (TWh)

Source: (CSIR, 2022)

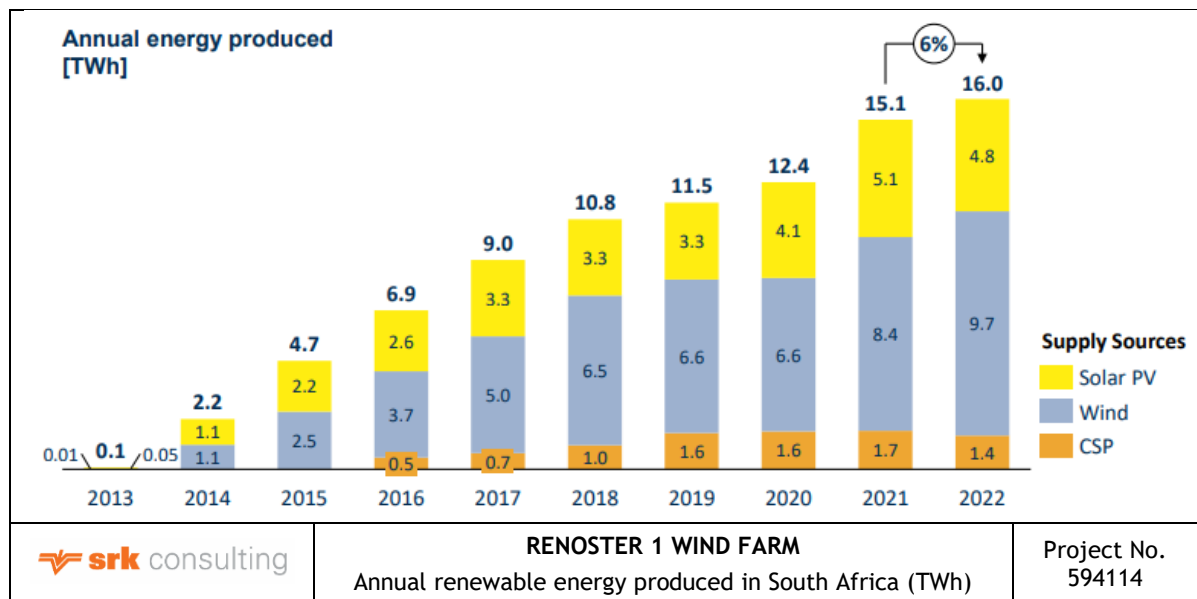


Figure 2-9: Annual renewable energy produced in South Africa (TWh)

Source: (CSIR, 2022)

An August 2021, amendment to the Electricity Regulation Act 4 of 2006 exempts embedded electricity generation projects between 1 MW and 100 MW from the previous requirement to apply for a generation licence, requiring them only to register with NERSA. In February 2022, a private electricity trading company was issued a licence which allows it to transmit energy from Independent Power Producers (IPPs) to private end-users in any location across the municipal and national electricity grid by 'wheeling' the energy across the national and municipal grid networks. These developments are expected to further drive availability of, and demand for, independently produced renewable energy in

South Africa and increase in the number of South African IPPs (Business Essentials, 2022) independently of the REIPPPP.

2.5.1.2 Increased Renewable Power Generation to Reduce Carbon Emissions from Other Energy Sources

Once operational, WEFs generate electricity that is largely free of CO₂ equivalent (CO_{2e}) emissions⁷. WEFs are thus considered important elements in the transition to a low-carbon economy, especially where they replace (current or future) power sources with high CO_{2e} emissions, such as thermal (typically coal or gas fired) power plants (Figure 2-10).

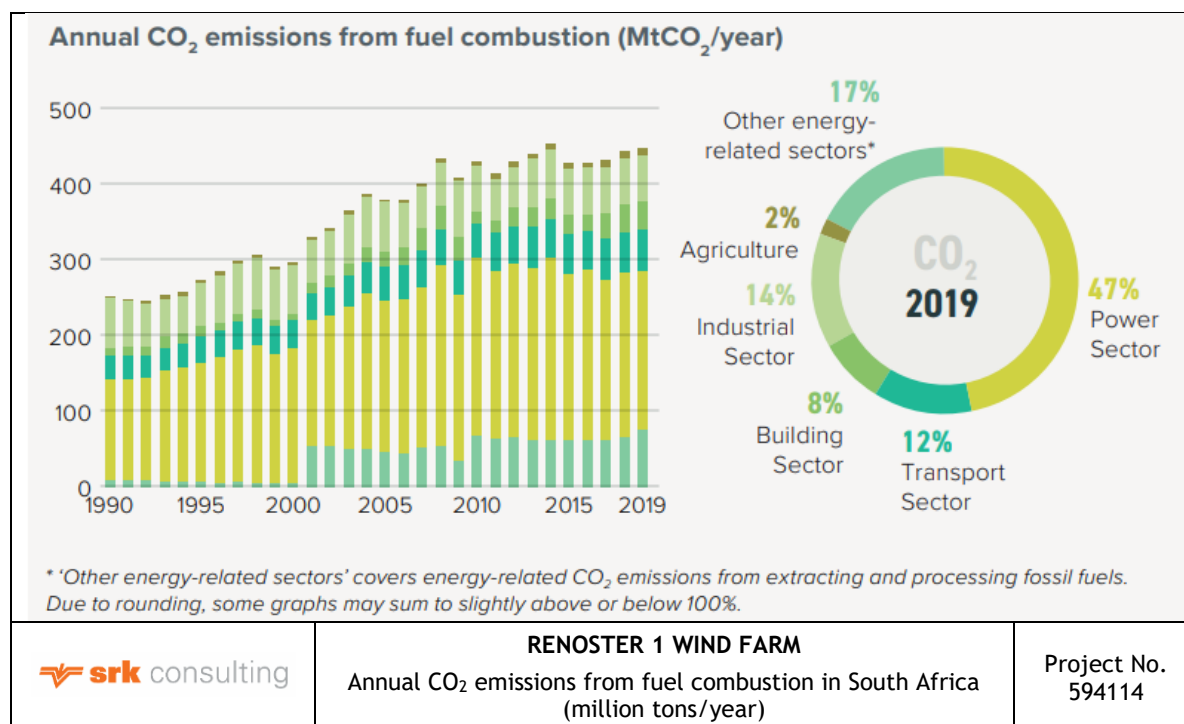


Figure 2-10: Annual CO₂ emissions from fuel combustion in South Africa (million tons/year)

Source: (Climate Transparency, 2020)

In 2019, electricity generated by Eskom produced ~212 Mt CO_{2e} (EcoMetrix Africa, 2020), ~44% of South Africa's total emissions from fuel combustion (Our World in Data, n.d.). Renewables accounted for 6.5% of power generated in South Africa in 2019. That represents a 158% increase from 2014 to 2019, although the contribution of renewables to the energy mix remains low, while the proportion of power generated from coal (88%) has hardly decreased (see Figure 2-11) (Climate Transparency, 2020).

The emissions intensity of the South African power sector and the energy intensity of its economy are both nearly double the G20⁸ average (see Figure 2-12), while South Africa's share of renewable energy in power generation (6.5%) is low compared to the G20 average (27%) (Climate Transparency, 2020). Renewable energy projects were thus identified in South Africa's IRP as an important component of South Africa's energy mix going forward (see Section 3.2.1).

⁷ Manufacturing, transportation and installation of renewable energy plant components result in CO_{2e} emissions. Volumes depend on the source and recycling content of materials (particularly concrete and steel for WEFs), type of energy used for manufacturing and distance over which materials are transported (IRENA, 2019).

⁸ The G20 comprises Argentina, Australia, Brazil, Canada, China, France, Germany, Japan, India, Indonesia, Italy, Mexico, Russia, South Africa, Saudi Arabia, South Korea, Turkey, the United Kingdom, the United States, and the European Union. Its members account for more than 80% of world GDP, 75% of global trade and 60% of the population of the planet (DFAT, n.d.).

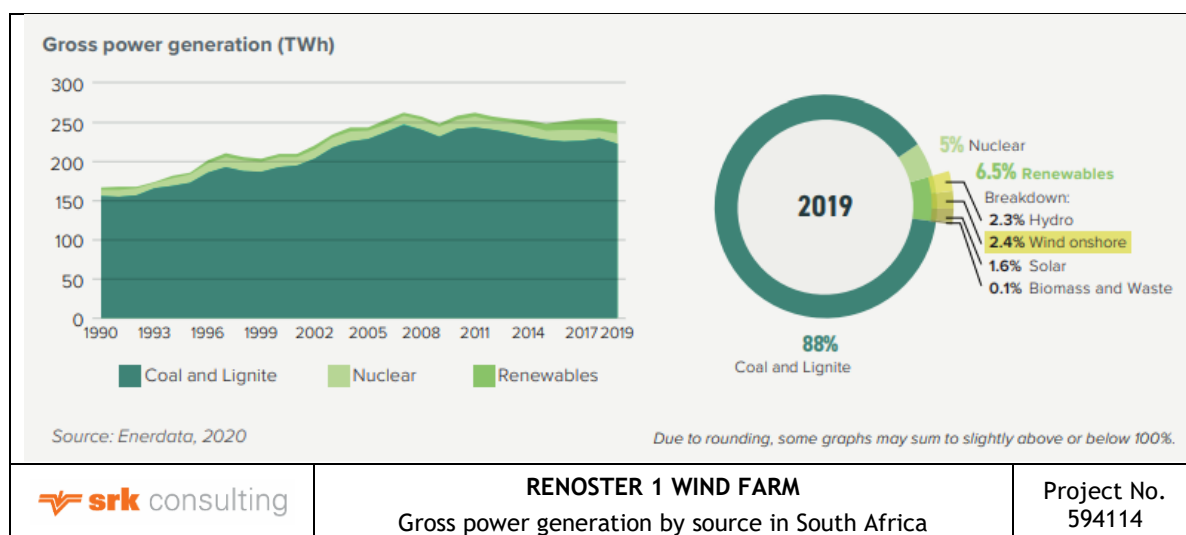


Figure 2-11: Gross power generation by source in South Africa

Source: (Climate Transparency, 2020)

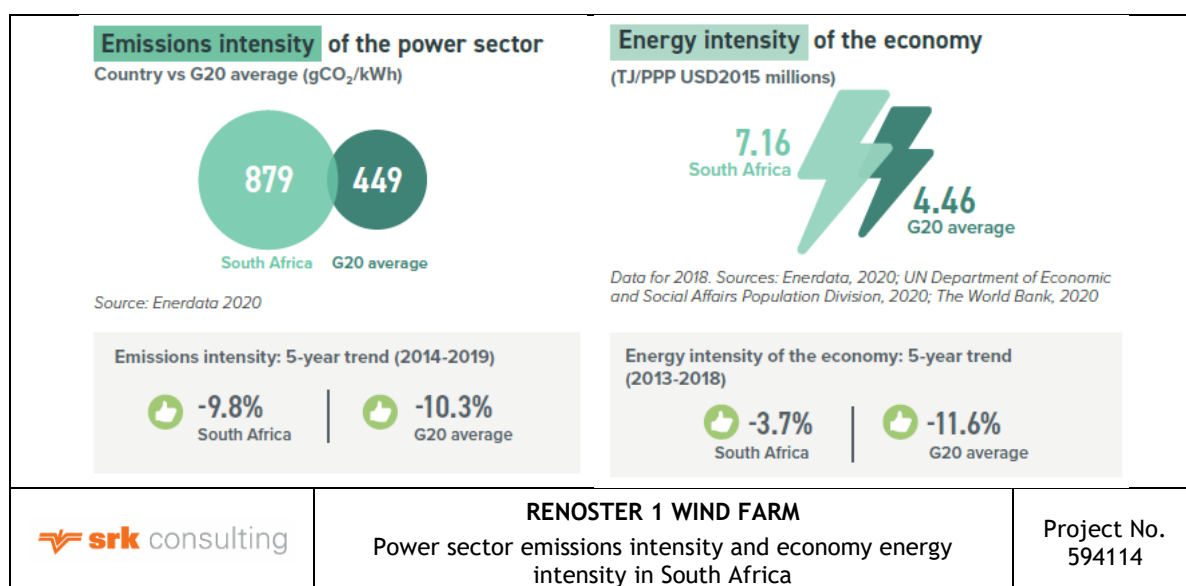


Figure 2-12: Power sector emissions intensity and economy energy intensity in South Africa

Source: (Climate Transparency, 2020)

A greenhouse gas (GHG) Life Cycle Assessment (LCA) estimates that the Renoster 1 Wind Farm will lead to emissions of 0.2 Mt CO_{2e}, predominantly during the Construction Phase (mainly from the production of wind farm components) and is estimated to reduce the carbon stock by ~0.074 Mt CO_{2e} due to land use changes (see Table 2-4) (Promethium Carbon, 2024).

Table 2-4: Carbon stock losses from land use changes

	Infrastructure Area	Tonnes Carbon/ha	Tonnes Carbon for infrastructure area	Tonnes CO _{2e}
Aboveground Biomass	454	0,0054	3	11
Soil Organic Carbon	454	45	20 430	74 910
Belowground Biomass	454	0,0162	7	26
Total				74 947

Source: (Promethium Carbon, 2024).

During operations, under the conservative assumption that the project will have a nameplate generation capacity of 240 MW, it is estimated that the project will result in the avoidance of 0.7 Mt CO_{2e} per annum when compared to the Eskom coal-fired power generation baseline, or 14 Mt CO_{2e} over the 20-year lifespan. In other words, taking account of emissions generated by the project (during construction), the project is anticipated to offset ~13.5 Mt CO_{2e} over the lifespan of the project. This equates to ~6.3% of Eskom's carbon footprint in 2019 (or 0.3% of Eskom's carbon footprint per annum) (Promethium Carbon, 2024).

By generating renewable energy, the project contributes to improving South Africa's energy security and lowering the carbon intensity of South African energy production, by supplementing or replacing power generated by Eskom from thermal power plants.

2.5.2 Motivation for the Renoster 1 Wind Farm Project

Red Cap intends generating renewable electricity at the Renoster 1 Wind Farm, to either feed into the Eskom grid through an award in a future REIPPPP bid window or (wheeling) agreements with private end-users/off-takers. The proposed grid connection infrastructure, which will be ceded to Eskom, is required to step up and transmit power from the WEFs to collector substations and from there to the Eskom grid for onward transmission.

As noted in Section 2.5.1.1, South Africa needs to add 40 000 to 50 000 MW of new capacity by 2037 to provide for South Africa's existing and growing energy demand and thereby facilitating economic growth. Noting that the nameplate capacity of the cluster will be at least 720MW, the cluster could address more than 1.5% of country's demand for new energy sources. The production of renewable power by proposed Renoster 1 Wind Farm will also reduce the carbon intensity of South Africa's energy output.

Red Cap considers the proposed Renoster 1 Wind Farm project site to be suitable for the development of WEFs and evacuation to the grid for the following reasons:

- *Resource availability:* As shown in Figure 2-3, the site is mapped as having a moderate to good wind resource;
- *Grid access and availability:* The Theseus-Grootvlei, Leander-Grootvlei and Perseus-Grootvlei 400 kV powerlines all intersect the western portion of the site, facilitating cost-effective evacuation of power to the Eskom grid (Figure 2-13);
- *Site extent and sensitivity:* The identified project site is sufficiently large to accommodate a WEF while avoiding known environmentally sensitive areas;
- *Topography and land use:* The gently undulating topography of project site and the largely agricultural use of land makes it generally suitable for the installation of wind turbines;
- *Landowner support:* The majority of landowners in the project area are supportive of the project and have signed agreements with Red Cap; and
- *Site access:* Although the road network in the region is in fairly poor condition, clear access to the site is available and can be improved where required.

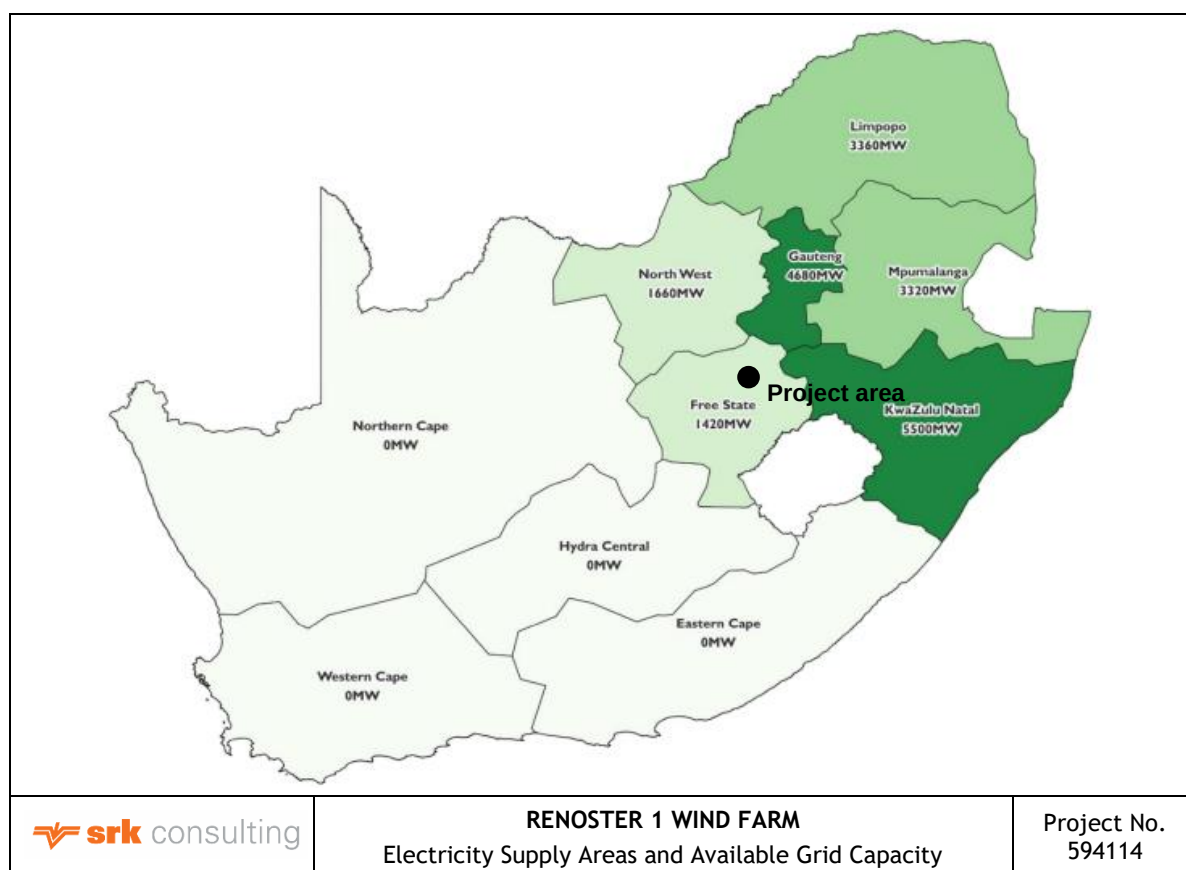


Figure 2-13: Electricity supply areas and grid available capacity

Source: (Eskom, 2023)

2.6 Project Alternatives

The mitigation hierarchy is a critical framework used in EIAs to manage and mitigate the adverse effects of developments on the environment. The hierarchy begins with avoidance, which seeks to prevent negative impacts from occurring in the first place. If avoidance is not feasible, the next step is to minimise the impacts through design modifications or operational changes. Rehabilitation involves restoring affected environments to their original state, while offsetting compensates for any residual impacts that cannot be mitigated through the previous steps.

NEMA mandates that EIAs must consider the mitigation hierarchy to ensure that environmental impacts are systematically avoided, addressed and managed. Avoidance of impacts can be achieved through considered analysis of project alternatives. Appendix 2 Sections 2 (1) (g) (i) and (x) and Appendix 3 Sections 3 (1) (h) (i) and (ix) of the EIA Regulations, 2014 require that EIA processes must identify and describe alternatives to the proposed activity that were considered or motivate why alternatives were not considered. Different types or categories of alternatives can be considered, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives.

Not all categories of alternatives are applicable to this project, as discussed below and summarised in Table 2-5.

Table 2-5: Alternatives considered

Alternative type	Alternatives considered	Reference	Assessed in the S&EIR
Location	Project location	2.6.1	Yes
	Alternative location		No

Alternative type	Alternatives considered	Reference	Assessed in the S&EIR
Layout	Covering entire development area	2.6.2	No
	Reduced development envelope based on environmental sensitivities		Yes
Activity	Activity as described in Scoping Report	2	Yes
	No-Go alternative	2.3.2	Yes
No-Go		2.3.2	Yes

2.6.1 Project Location Alternatives

Red Cap identified available grid capacity at three existing transmission lines - Grootvlei-Theseus 400 kV, Grootvlei-Perseus 400 kV, and Grootvlei-Leander 400 kV - to evacuate energy from potential renewable energy projects in the Free State. Proximity to these lines was a major siting consideration to ensure financial viability by avoiding high transmission infrastructure costs. A large “initial investigation area” was selected near the transmission lines, based on relatively good wind resource.

Red Cap undertook an internal constraint mapping exercise to identify the most suitable development area for the Renoster Wind Farm Project i.e. the location with least environmental and social impact and highest technical suitability. The following criteria were considered:

- Avoidance of environmentally sensitive areas, e.g. Critical Biodiversity Areas (CBAs), national parks and major watercourses;
- Avoidance of socially sensitive areas, e.g. inhabited areas;
- Support of and approval by landowners that form part of the cluster;
- Suitable terrain for the establishment of turbines, requiring a minimum of earthworks;
- Sufficient available area to site the cluster of projects;
- Good accessibility from existing roads;
- Relatively good wind resource in the area;
- Proximity of tie-in points to the Eskom grid; and
- Availability of grid (transmission) capacity in the region.

The identified development area largely satisfies the above criteria, which makes the identified site well suited for the development of a WEF cluster. As such, no alternative locations or sites are further assessed for the Renoster Wind Farms Development and specifically for the Renoster 1 Wind Farm project.

2.6.2 Layout Alternatives

A comprehensive, iterative design process has been undertaken to refine the layouts of the Renoster Wind Farm projects and associated grid connection infrastructure. This process has integrated environmental and social sensitivities with technical design from early in the project lifecycle, reflecting the principles of Integrated Environmental Management (IEM). It has enabled the project to reduce risks while adhering to the mitigation hierarchy—demonstrating the avoidance, minimisation, and mitigation of impacts throughout the design progression.

By embedding environmental and social constraints into the technical development of the project from the outset, and updating the design based on specialist input at frequent junctures, Red Cap has effectively conducted an ongoing process of alternatives analysis. Additionally, this integrated design approach reduces the risk of any fatal flaws arising during the formal EIA process.

This approach ensures compliance with NEMA's requirements to consider alternatives, including location alternatives.

Table 2-6 summarises the process and phases of the design progression of the Renoster Wind Farms Development undertaken by Red Cap between June 2022 and March 2024.

Table 2-6: Renoster Wind Farms Development design progression

Project Area Boundary Refinement 1: June 2022 - August 2022 Number of Turbines: 903 Extent: 180 000 ha
High-level environmental and social sensitivity screening of the initial investigation area was used to focus initial landowner negotiations on less sensitive areas, particularly those as close as possible to the transmission lines. Following these landowner negotiations, the site investigation area was refined to a smaller, "Revised Investigation Area". A preliminary turbine layout was then developed based on desktop sensitivity data.
Project Area Boundary Refinement 2: August 2022 - October 2022 Number of Turbines: 429 Extent: 90 000 ha
Based on successful initial landowner engagements at properties in the western portion of the Revised Investigation Area, particularly those farm portions closest to the existing transmission infrastructure, the project area boundary was further refined, now termed the "priority Focus Area." A revised turbine layout was developed for this area using publicly available desktop sensitivity data.
Project Area Boundary Refinement 3: October 2022 - September 2023 Number of Turbines: 270 Extent: 50 000 ha
Landowner negotiations were then intensified within the priority Focus Area, and specialists were appointed to conduct an initial, but detailed, desktop sensitivity analysis (mapping) of the area. This analysis was informed by publicly available information as well as high-resolution aerial photography, which supported more accurate specialist assessments of the site, including: • Modelled sensitive avifaunal habitats; • Detailed mapping of rivers and wetlands, including their type, ecological condition, and erosion status; • Mapped sensitive bat habitats; • Identification of sensitive visual and noise receptors; and • Mapped stands of listed (Endangered) intact natural vegetation. As a result, the sensitivity mapping at this stage of the design process was already relatively precise. Following this detailed specialist desktop screening, the site sensitivity was updated, and the site boundary was further refined. It expanded into areas in the south that were considered to have low environmental sensitivity but relatively good wind resource, while portions of the site in the northeast, where the large perennial Renoster River flows (associated with heightened aquatic, avifaunal, and bat sensitivity), were excluded. A revised turbine layout was then developed based on the updated specialist desktop sensitivity mapping.
Turbine Layout Refinement 1: September 2023 to March 2024 Number of Turbines: 264 Extent: 50 000 ha
Specialists were then appointed to conduct site inspections of the revised site boundary and turbine layout to inform the next iteration. Following detailed site screenings, including physical inspections, specialists submitted updated and ground-truthed sensitivity maps.

At this stage in the design progression, the layout had already been shaped by detailed specialist desktop sensitivity mapping, so only relatively minor adjustments were required to the turbine layout. However, based on the updated, ground-truthed information, the turbine layout was refined to avoid the newly identified sensitive areas, resulting in a reduction to 264 turbines.

Notable additional specialist sensitivity mapping that prompted these refinements included:

- On-site identification of potential bat roosts by the bat specialist;
- Avifaunal species risk modelling;
- An updated noise model, based on on-site verification of noise receptors by the noise specialist; and
- Refined wetland and watercourse mapping from the aquatic ecologist.

Preliminary layouts of ancillary infrastructure were also developed using the updated sensitivity data provided by specialists. These March 2024 site boundary and infrastructure layouts now serve as the basis for the Scoping Report and preliminary impact assessments compiled by the specialists.

The iterative design process for the Renoster Wind Farms Development has ensured that environmental sensitivities were considered at every stage of development of the preliminary layout. The layout will be refined again following the Scoping Phase to incorporate specialists' design recommendations and feedback from stakeholders during the Scoping Phase stakeholder engagement. This updated layout, along with a description of how it has responded to specialist recommendations during Scoping, will be documented in the EIA report.

The current preliminary layout for the Renoster 1 Wind Farm, as assessed in this Scoping Report, comprises 69 potential turbine positions with associated infrastructure, depicted in Figure 2-7.

2.6.3 Activity Alternatives

Red Cap proposes to develop facilities to generate renewable energy, allowing for evacuation of at least 240 MW per WEF. It is not Red Cap's intention to utilise the property for any other activity. As such, there are no reasonable activity alternatives.

2.6.4 The No-Go Alternative

In addition to the alternatives described above, the No-Go alternative will be considered in the EIA in accordance with the requirements of the EIA Regulations, 2014. The No-Go alternative implies that the project does not go ahead, i.e. that no renewable energy will be generated on the site, and that current activities (notably agriculture) will continue, and/or that other activities not requiring authorisation may be pursued.

2.7 Post Authorisation, Pre-construction Actions

Assuming the project receives the requisite authorisations and achieves financial close, a number of additional actions would be required prior to the commencement of construction.

Most importantly in the context of this study, relevant specialists will be required to conduct a final walk down of the site with the specific objective of micro-siting – a process whereby the final footprint of specific infrastructure is adjusted in consultation with specialists and the technical team. This enables specialists to adjust layouts to accommodate any environmental changes that have occurred on site since the EA was issued, and to make accompanying recommendations for inclusion in the EMPs. These final EMPs are typically released for a 30-day public review period before being submitted to the CA. The approved EMPs become part of the official project and contract documentation.

Final haulage route/s will be confirmed pre-construction by the appointed logistics company/contractor and all relevant outstanding transport permits obtained.

2.8 Project Construction and Infrastructure

An Engineering, Procurement and Construction (EPC) Contractor will be appointed to oversee the construction and holds responsibility for the implementation of the EMPs and all environmental requirements therein. The Construction Phase is projected to last 24 months.

Vegetation in the development envelope will be retained where possible. Where necessary, vegetation will be cleared for:

- Turbine foundations;
- BESS platforms;
- Transmission line support structure (lattice/monopole) foundations and/or underground cabling;
- On-site substation foundations;
- Access roads and underground cabling;
- Laydown areas; and
- Building and support infrastructure footprints.

Stripped topsoil will be stockpiled, used as fill material to level certain features, removed from site and/or spread across the site.

Prior to demobilising, the EPC Contractor is also responsible for the reinstatement and rehabilitation of all temporary construction areas i.e. areas disturbed by construction activities but which do not form part of the permanent footprint of the project, e.g. site camps, excess road construction widths, temporary crane boom assembly areas and temporary blade laydown areas. Permanent and temporary areas of disturbance are listed in Table 2-3.

2.8.1 Access

In South Africa, the two ports of entry for wind turbine components are the Port of Saldanha and the Port of Ngqura. Abnormal loads, i.e. large wind turbine components like the blades, nacelles and towers (Figure 2-14), will require a special route from the port of entry to the site.



Figure 2-14: Examples of Transport of large WEF components – blades (left) and tower sections (right)

Possible limitations along the identified route will necessitate more detailed investigations to determine the level of road and bridge structure upgrading that will be required (if any) to accommodate the abnormal loads. Additional constraints that may require investigation include:

- Overhead power and telecommunication lines with insufficient ground clearance;
- Substandard geometry of roads and bridges; and
- Drainage issues.

Regionally, the site can be accessed from the main urban areas in the region via the well-established existing road network in the area:

- From Kroonstad, 50 km to the west, the site can be accessed from the R34;
- From Heilbron, 50 km to the north east, the site can be accessed from the R34; and
- From Mamafubedu, 50 km to the east, the site can be accessed from the S-66.

Permanent site access roads will be up to 8 m wide, with 2 m wide side drains on one or both sides depending on the topography. A (maximum) 20 m wide road corridor may be required to construct the 8m wide roads and side drains, with a strip(s) 10 m wide rehabilitated after construction. Many roads will have underground cables running alongside, within this 20m wide disturbance footprint.

2.8.2 Turbines

Wind velocity and consistency generally increase with altitude, therefore increasing the height of a turbine places the rotor into the higher velocity laminar winds which improves power generation. Since turbine technology is continually evolving it is neither sensible nor possible, at this early stage in the development process, for Red Cap to specify the exact turbine model and specification. In order to apply the precautionary principle, a maximum hub height of 200m, maximum blade length of 120 m, maximum tip height of 320 m and minimum tip height of 20 m is assessed in the EIA process (Figure 2-15), although it is unlikely that the turbines will be of this magnitude.

Each turbine will have a circular foundation with a diameter of up to 32 m, within a permanent crane pad with a maximum footprint of 65 m x 70 m (4 550 m²) (Figure 2-16, Figure 2-17). A temporary crane boom assembly area with a maximum footprint of 3 700 m² and a temporary blade laydown area with a maximum footprint of 2 400 m² will also be required at each turbine hardstand). Allowance is also made for an additional temporary embankment area with a footprint of 600 m² next to the blade laydown area where required due to slopes. In total, temporary construction areas for each turbine hardstand will have a maximum total footprint of 6 700 m².

The tower is constructed from tubular steel or steel reinforced concrete and supports the rotor and nacelle. Provision has been made for a single 6.5 ha concrete tower pre-assembly and storage yard should concrete towers be selected over steel towers.

Each wind turbine has three blades, which are usually coloured white or light grey for aviation safety and thermal reflectivity. However, turbine blades may be patterned/painted if required to mitigate avifaunal impacts (collisions) in compliance with Civil Aviation Authority (CAA) requirements (Figure 2-18). Advances in turbine technology allow for blades that can be transported to site in smaller sections and assembled on site, overcoming constraints associated with the transport of long blades.

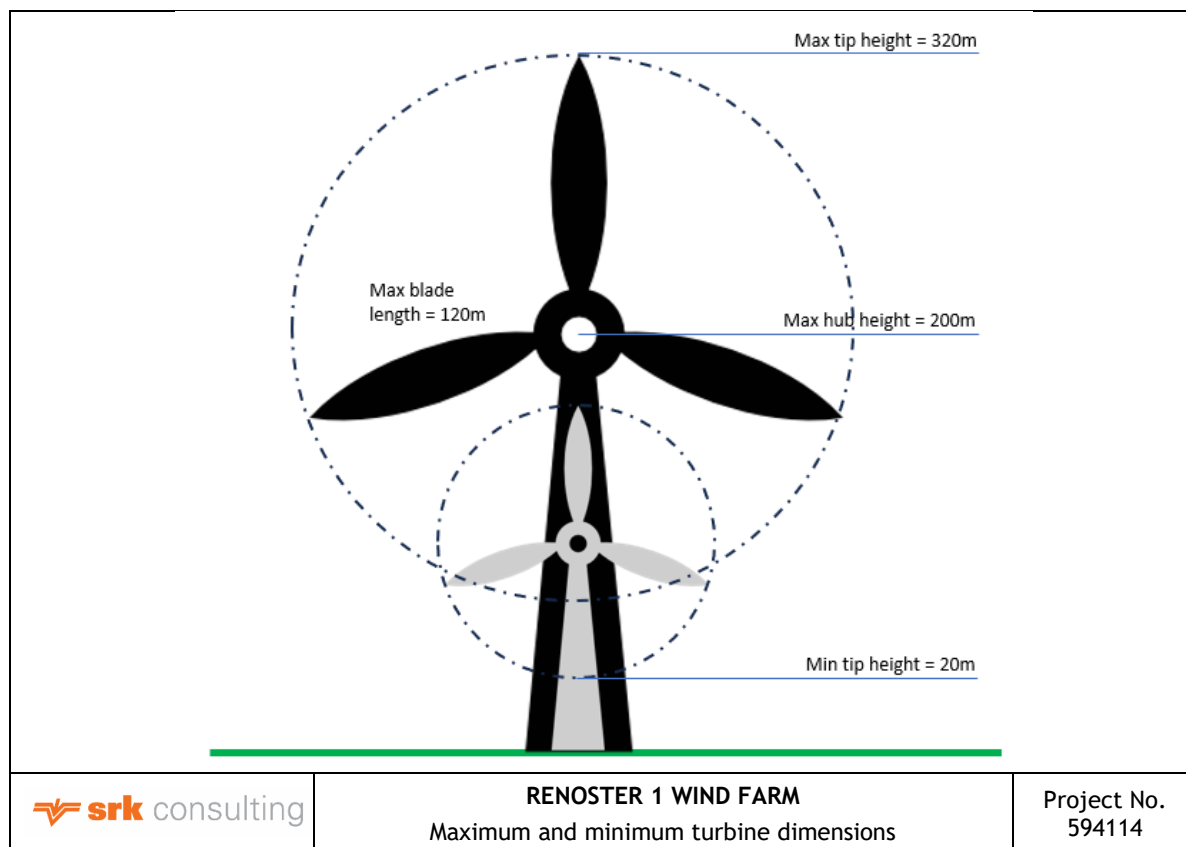


Figure 2-15: Maximum rotor swept area envelope and minimum tip height

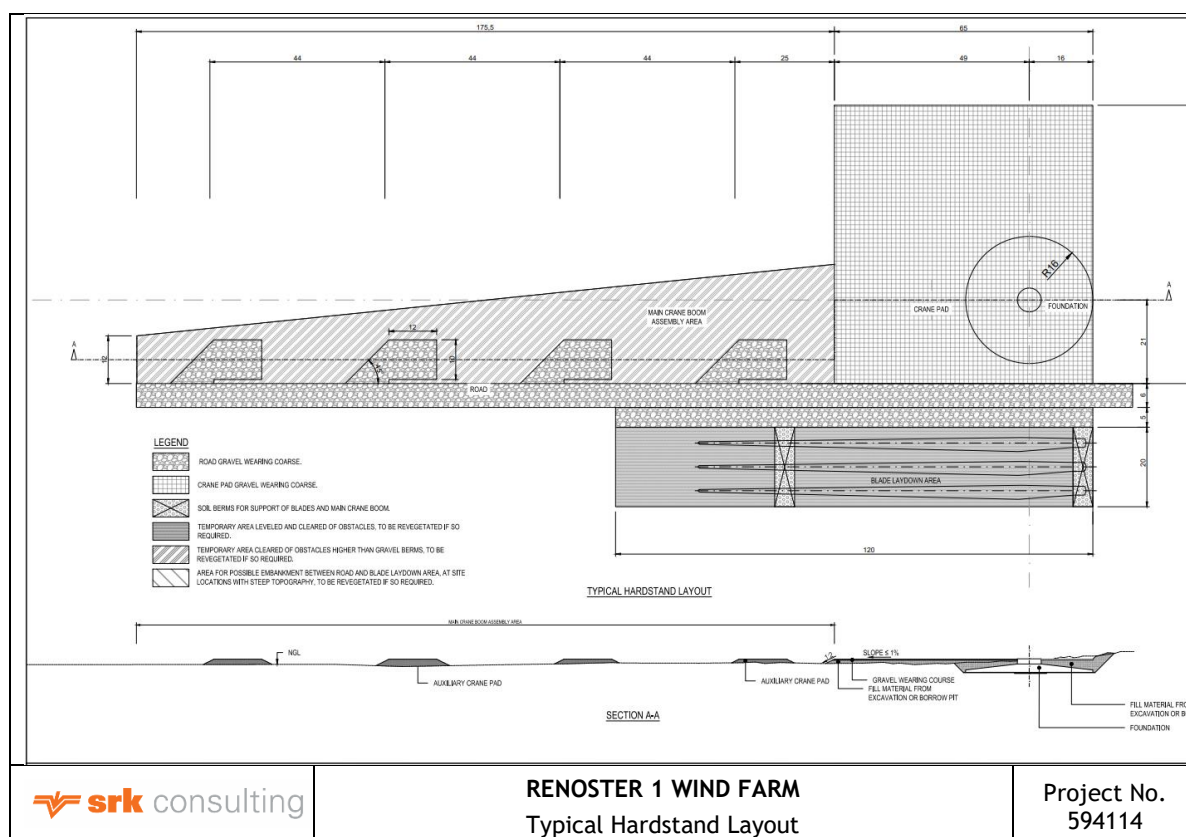


Figure 2-16: Typical turbine hardstand layout



Figure 2-17: Construction of a crane pad foundation (left) and tower sections being craned into position (right)



Figure 2-18: Example of a patterned wind turbine blade

Source: (Engineering News, 2023)

2.8.3 Substations

A substation is a part of an electrical generation, transmission and distribution system. Substations transform voltage from low to high, or the reverse, or perform any of several other important functions. A substation typically includes transformers to change voltage levels from low distribution voltages to high transmission voltages and, and/or is constructed at the connection of two different transmission voltage powerlines (see Figure 2-19).

The on-site substations will occupy up to 3.4 ha. They will receive incoming power from the Renoster 1 Wind Farm at up to 66 kV and will increase the voltage of outgoing electricity to 132 kV, which is converted from DC to AC. The on-site substations will be owned and operated by the IPP. The substation yards will house O&M buildings, substation buildings and High Voltage Gantries.

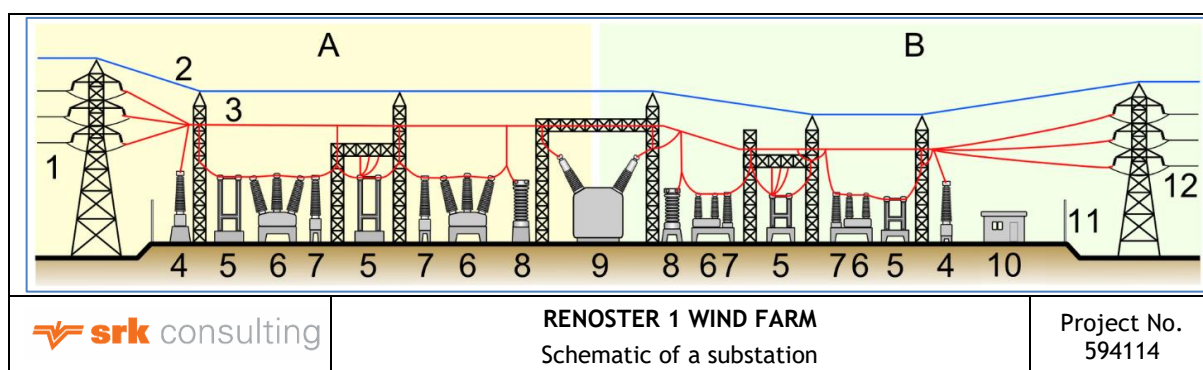


Figure 2-19: Schematic of a substation

Notes: Elements of a substation include 1. Primary powerlines, 2. Ground wire, 3. Overhead lines, 4. Transformer for measurement of electric voltage, 5. Disconnect switch, 6. Circuit breaker, 7. Current transformer, 8. Lightning arrester, 9. Main transformer, 10. Control building, 11. Security fence, 12. Secondary powerlines

Source: By Shigeru23 - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=14896493>

2.8.4 Battery Storage Facilities (BESSs)

BESSs will be constructed for the Renoster 1 Wind Farm to store energy generated by the WEF, reducing intermittency making dispatchable energy supply from the WEF more efficient, available and reliable.

The preliminary WEF layout provides for the installation of three BESSs, each with a footprint of up to 3.5 ha. BESSs mostly comprise an assemblage of container-sized battery modules (Figure 2-20). The BESSs will be fenced and located in close proximity to the on-site substations and will connect to the substations by up to 66 kV cables.

The BESSs may require their own substations, including typical substation components and be located within the BESS footprint, or other substation infrastructure/O&M facilities installed within the designated BESS footprint areas, in which case short 132 kV connections to Eskom switching stations (located within the Renoster 1 project area but included in the Grid Connection project) may be required, using either monopole or lattice type pylons up to 32 m in height.

The BESSs will either be Solid State (Lithium Ion) or Redox Flow based on an evaluation of both technologies by the IPP.

Each BESS will be compliant with all local laws and regulations and health and safety requirements governing battery facilities.

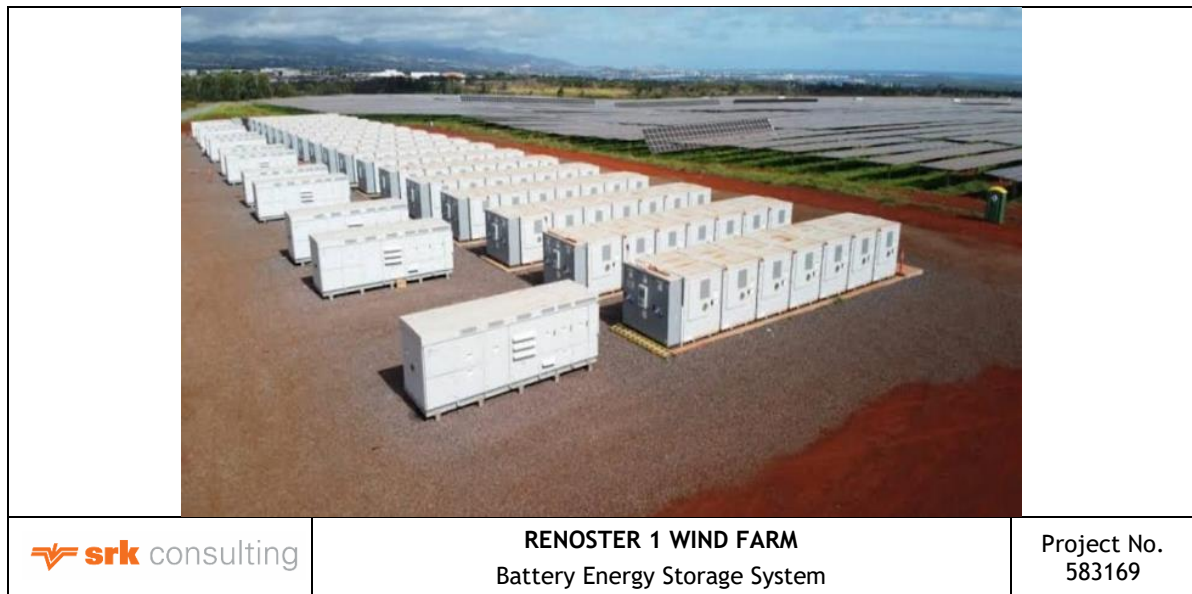


Figure 2-20: Example of a BESS

Source: (MFAME, 2022)

2.8.4.1 Solid State BESSs

Solid state battery cells are integrated into battery modules, which are installed in standard racks similar to those used for telecommunication equipment. Typically, the racks are installed in a specially prepared shipping containers to function as an integrated battery system.

Containers will be placed on raised concrete plinths and may be stacked on top of each other to a maximum height of approximately 15 m. Each container has a footprint of ~60 m² and is ~4 m high. Additional equipment, e.g. inverters and temperature control equipment, may be positioned between the battery containers. Sufficient spacing between each container must be ensured to adhere to safety requirements.

Lithium ion battery systems arrive on site fully encased (i.e. are not assembled on site) and have a number of design features that mitigate key risks of solid state batteries:

2.8.4.2 Redox Flow BESSs

Redox Flow batteries are charged and discharged by means of an oxidation – reduction reaction of ions. Redox Flow BESSs have a long lifespan, up to 20 years, with an unlimited number of charge and discharge cycles available without any degradation. The electrolytes can be used semi-permanently. The Redox Flow batteries are versatile, allow flexible design and enable a single system to address both short and long periods of output variation, enabling cost-effective power generation. In addition, the batteries can operate under normal temperatures and are composed of non-combustible or flame-retardant materials, such that the risk of fire with a Redox Flow battery is extremely low.

2.8.5 Laydown Areas and Ancillary Facilities

In addition to the temporary turbine hardstand areas described above, the project will require the following temporary construction areas:

- Temporary site camp/s areas of ~20 000 m²;
- Batching plant area of ~10 000 m²;
- General laydown area of ~36 000 m²; and

- Bunded fuel and lubricants storage facility at the site camp (storing more than 80 m² but less than 500 m² of dangerous goods).

Renoster 1 Wind Farm construction camp(s) and laydown area(s) will be located inside the 3.4 ha on-site substation sites⁹. The laydown area will be used to store project components, building materials and equipment. If necessary, a temporary concrete batching plant will be installed to produce concrete for foundations and/or platforms. Other options include mobile batching plants that allow *in situ* batching of concrete. Aggregate, cement and sand will be imported to the site from commercial sources.

Fuel (petrol and diesel) will be trucked to site and temporarily stored on site during the Construction Phase, in tanks and bowzers in bunded areas. The fuel tanks and bowzers will be removed from the site upon completion of the Construction Phase.

Ancillary structures and infrastructure which will be erected during construction to support the operation of the Renoster 1 Wind Farm include offices, an operational control centre, O&M area/warehouse/workshop and ablution facilities, most of which will be located near the on-site substations and BESS facilities. Temporary and permanent yard areas will be secured (with access control) with a ~2.4 m high fence.

Fencing will not be erected around individual turbines but will be erected around the perimeter of the substations. Existing fencing around the perimeter of properties will be retained and four guard houses will be constructed to control site access.

2.8.6 Cables

Each turbine will be connected to its respective on-site substation via medium voltage (up to 66 kV) underground cables or powerlines. For the most part, cables will be laid underground in trenches (~1 m deep), generally running alongside existing or proposed internal roads within the planned 20 m road corridor. However, in a few instances, where burying of cables is not possible due to technical, geological, environmental or topographical constraints, short overhead powerlines will be erected.

The up to 66 kV internal overhead powerlines will be supported by steel or concrete monopoles, or wooden structures of up to 32 m in height. Typical types of the proposed internal overhead powerlines are depicted in Figure 2-21.

2.8.7 Water Use and Supply

Water will be required during construction of the Renoster 1 Wind Farm for:

- Domestic use (ablutions, drinking);
- Civil works (road construction, foundations, earthworks, etc); and
- Dust suppression on roads, as and when needed depending on conditions.

Water will be sourced from authorised service providers, existing legal sources and/or existing or new boreholes¹⁰. Temporary water pipelines will be installed during construction to supply the construction camp and ancillary facilities.

⁹ The exact location(s) within the development envelope will be determined during the Pre-construction Phase, based on a survey conducted at the time.

¹⁰ A Water Use Authorisation, if required, will be pursued once the project has been awarded preferential bidder status and final design is underway.

Water consumption during construction will be ~80 000 m³/a over a two-year construction period.

Measures to reduce water use and prevent water pollution will be implemented and specified in the EMPr.

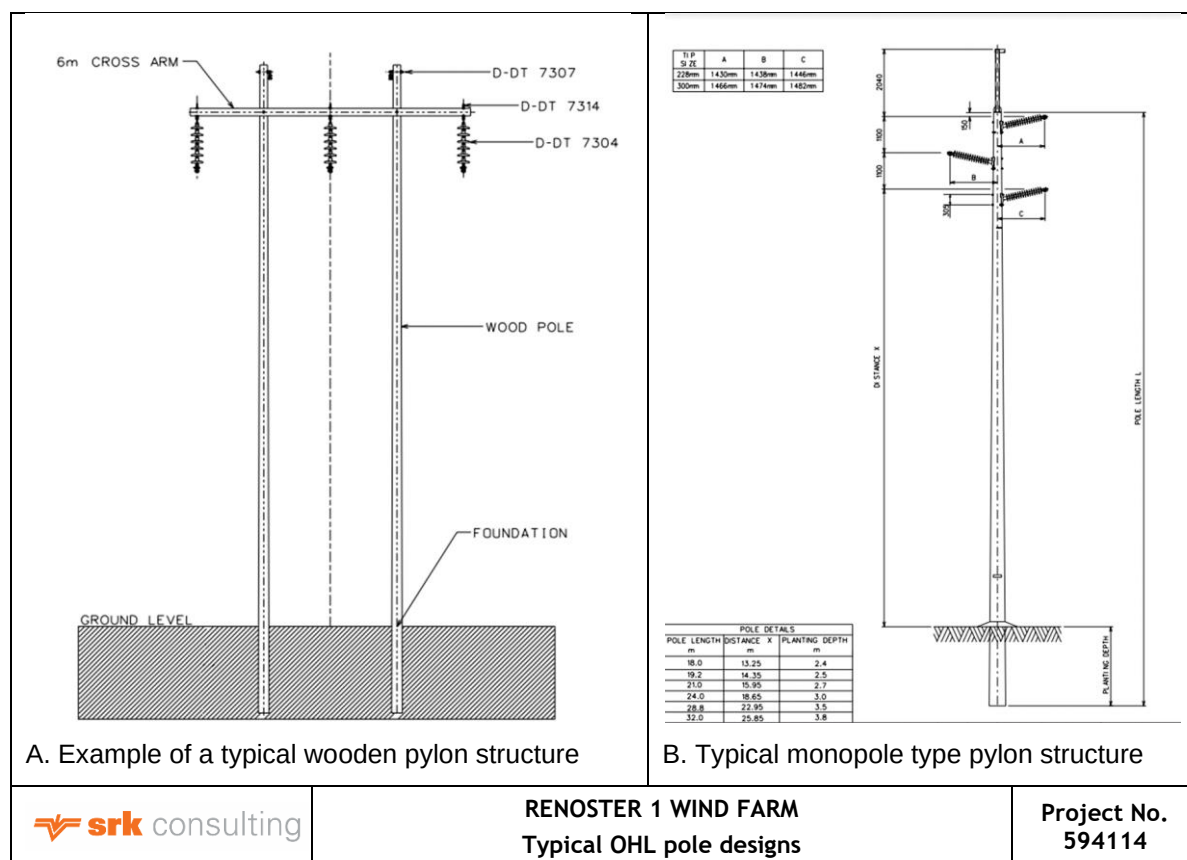


Figure 2-21: Typical types of pylons for the proposed up to 66kV internal overhead powerlines (where trenching is not viable)

2.8.8 Waste and Wastewater Management

Waste management during construction will be the responsibility of the Contractor and guided by the requirements of the EMPr.

The waste hierarchy and waste management procedures will be implemented during construction to prevent, minimise or recycle waste (where possible) (Figure 2-22). Solid waste produced during the Construction Phase will include:

- Typical construction rubble (rock, sand, soil and concrete);
- General waste; and
- Contaminated waste such as dirty/used oil and grease and contaminated materials and soil.

All construction waste will be removed from work areas and disposed of at licensed (municipal) waste disposal facilities. Where possible, options to reuse or recycle waste materials will be favoured over disposal. Hazardous waste will be disposed of at a licensed hazardous waste disposal facility and waste disposal manifests will be available to the CA upon request.

The total volume of waste that will be generated cannot be estimated at this stage but is not expected to be significant nor compromise local waste management handling and disposal capacity. At this

stage it is proposed to temporarily store less than 100 m³ general and less than 80 m³ hazardous waste on site at any one time¹¹.

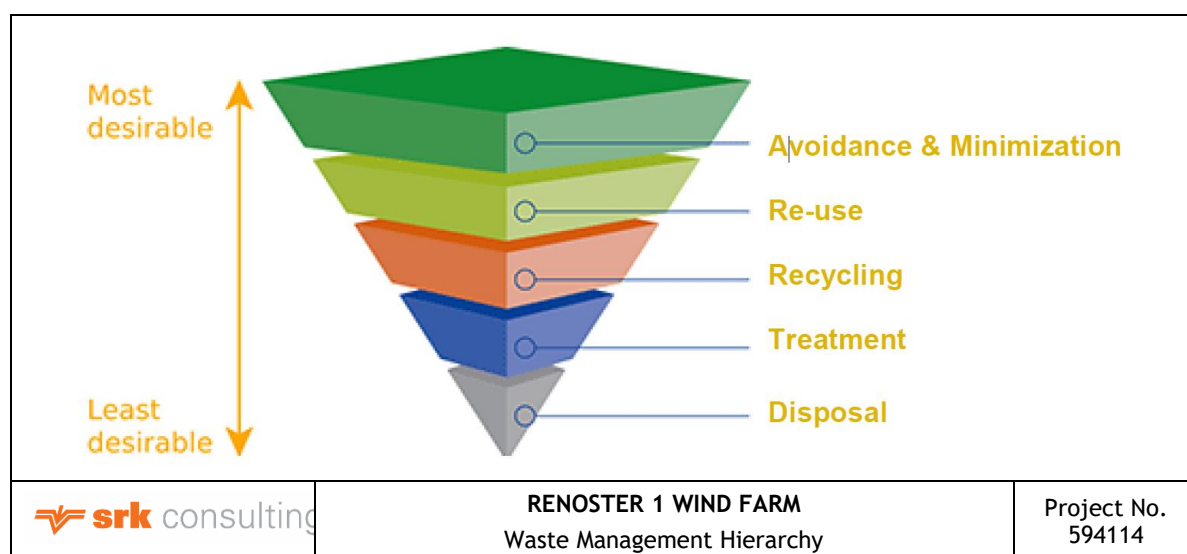


Figure 2-22: Waste management hierarchy

Wastewater produced during the Construction Phase comprises contaminated runoff, wash water and domestic wastewater. Wastewater will be captured in either septic or conservancy tanks and disposed of at a suitable facility.

2.8.9 Stormwater Management

Stormwater measures will be implemented on site to divert stormwater from potentially contaminated areas such as fuel storage, waste storage and BESS containers, and to prevent accidental leaks/spillages from entering watercourses.

2.8.10 Workforce

Construction will primarily be undertaken by an EPC Contractor. Local sub-contractors will be appointed where possible.

The workforce required for construction of the Renoster 1 Wind Farm will be provided in the Impact Assessment Phase. No labourers will be accommodated (reside) on site.

2.8.11 Construction Hours

Most construction activities are expected to occur during normal working hours (07h00 - 18h00), largely limited to Mondays to Saturdays. Construction will only be allowed after normal working hours and on Sundays where unavoidable, and if the Contractor is able to provide the engineer with adequate motivation.

2.8.12 Capital Expenditure

Anticipated capital expenditure (CapEx) for the Renoster 1 Wind Farm will be provided in the EIA Phase. The proportion of CapEx that will be spent in local areas (in the Free State) will be determined at detailed design stage.

¹¹ Deviations from this may require approval in terms of the National Environmental Waste Act 59 of 2008 (NEM:WA).

2.8.13 Construction Schedules

The project requires EA from DFFE, Preferred Bidder status awarded by the DMRE and/or another Power Purchasing Agreement (PPA) and a generation licence issued by NERSA.

The anticipated duration of the Construction Phase for the Renoster 1 Wind Farm is 24 months.

2.9 Operation and Maintenance Activities

Once constructed, the Renoster 1 Wind Farm will be commissioned into operation. The anticipated lifetime of the Renoster 1 Wind Farm is 20 years minimum, with the potential option to upgrade technology to extend the lifetime of the project.

2.9.1 Water Use and Supply

Water will be required on the Renoster 1 Wind Farm site during operation for:

- Domestic use (ablutions, drinking); and
- Dust suppression, as and when needed depending on conditions.

A total of 2 500 m³/annum will be required throughout the Operational Phase.

Water will be sourced from authorised service providers, existing legal sources and/or existing or new boreholes and/or from rainwater harvesting.

2.9.2 Waste and Wastewater Management

The waste hierarchy and waste management procedures will be implemented during operation to prevent, minimise or recycle waste (where possible).

Solid waste produced during the Operation Phase for the Renoster 1 Wind Farm will include small volumes of domestic waste, packaging from replacement equipment, discarded components and vegetation cuttings. The volume of waste that will be generated cannot be estimated at this stage but is not expected to be significant or place strain on local waste management and disposal facilities.

No waste will be generated during normal operations of the BESS. However, battery cells may need to be replaced. The supplier will be responsible for removing the battery cells from site during the guarantee period and ensuring that battery cells are properly disposed of in accordance with legal requirements.

Waste management during operation of the Renoster 1 Wind Farm will be the responsibility of the WEF operator. All waste generated during maintenance and operation activities will be disposed of at appropriately licensed waste disposal facilities.

Wastewater produced during the Operation Phase of the Renoster 1 Wind Farm comprises contaminated runoff and domestic wastewater. Wastewater will be stored in septic tanks and/or conservancy tanks and disposed of at a suitable facility. Wastewater may also be treated in a mobile wastewater treatment unit and will comply with DWS standards (see Figure 2-23). Treated water can then be used for irrigation.

2.9.3 Stormwater Management

Stormwater measures will be implemented on site to divert stormwater away from potentially contaminated areas such as BESS containers, and to divert accidental leaks/spillages away from watercourses.

2.9.4 Workforce

The operational workforce of the Renoster 1 Wind Farm will be provided in the Impact Assessment Phase.

Most employees are likely to reside in the LM and DM. No labourers will be accommodated onsite.

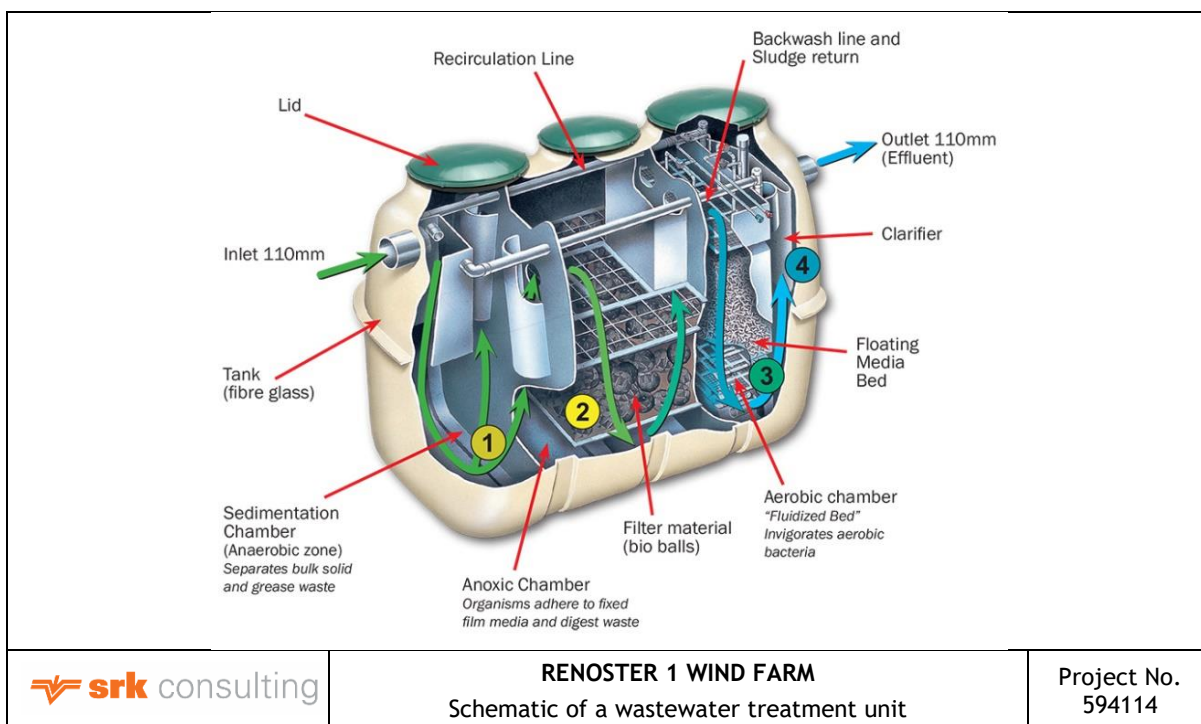


Figure 2-23: Schematic of a wastewater treatment unit

Source: (Maskam Water, n.d.)

2.9.5 Operational Expenditure

Anticipated operation expenditure (OpEx) for the Renoster 1 Wind Farm will be provided in the Impact Assessment Phase.

The proportion of local procurement and expenditure has not yet been determined.

2.9.6 Maintenance

Maintenance activities related to the Renoster 1 Wind Farm include:

- Periodic maintenance of turbines, on-site substations and BESSs;
- Grading of the internal roads and access roads; and
- Periodic and emergency repairs of WEF infrastructure.

Maintenance of the Renoster 1 Wind Farm on-site substations and BESS will require periodic, planned inspection and, if necessary, repair and replacement of equipment and structures. Maintenance typically includes visual and physical inspections and monitoring of data collected by on-site meters and sensors.

Internal roads and other infrastructure will be maintained as and when required. Vegetation will be trimmed and cleared to maintain access.

2.10 Decommissioning Activities

At the end of the 20-year Operational Phase, the lifespan of the WEF may be extended (subject to the necessary authorisations and agreements with the landowners), in which case the turbines may be refurbished/upgraded or replaced with the latest turbine technology at that time.

Alternatively, should the lifespan of the WEF not be extended beyond the 20-year Operational Phase, the facility will be decommissioned and will be subject to the necessary authorisations.

For the purposes of this assessment, decommissioning is expected to generate impacts on par with the Construction Phase.

3 Governance Framework

3.1 South African Legislation

There are a number of regulatory requirements at local, provincial and national level with which the project must conform. Key environmental legal requirements include the following:

- NEMA (as amended);
 - EIA Regulations, 2014, promulgated in terms of NEMA;
 - National Web Based Environmental Screening Tool;
 - Procedures for the assessment and minimum criteria for reporting on identified environmental themes;
 - Generic EMPr for substation and overhead transmission and distribution infrastructure;
- National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA);
- National Water Act 36 of 1998 (NWA);
 - Regulation Regarding the Procedural Requirements for Water Use Licence Applications (WULA) and Appeals, 2017;
- NHRA; and
- Subdivision of Agricultural Land Act 70 of 1970 (SALA).

A brief summary of SRK's understanding of the relevant Acts and Regulations that are applicable to this study is provided below. Note that other legislative requirements may also pertain to the project. As such, the summary provided below is not intended to be definitive or exhaustive and serves only to highlight key environmental legislation and obligations.

3.1.1 National Environmental Management Act 107 of 1998 (as amended)

NEMA establishes a set of principles which all authorities must consider when exercising their powers. These include the following:

- Development must be sustainable;
- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental consequences of a policy, project, product or service applies throughout its life cycle.

Section 28(1) states that "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". If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;

- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal requirements for this project:

Red Cap Renoster 1 (Pty) Ltd has a responsibility to ensure that the proposed activities and the S&EIR process conforms to the principles of NEMA. In terms of Section 28 of NEMA, the proponent is obliged to take actions to prevent pollution or degradation of the environment, and to ensure that the environmental impacts associated with the project are considered and mitigated where possible.

3.1.1.1 EIA Regulations, 2014

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA issued by the CA (DFFE). In this context, the EIA Regulations, 2014¹², promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of EIAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA ('NEMA listed activities').

The EIA Regulations, 2014 lay out two alternative authorisation processes. Depending on the type of activity that is proposed, either a BA process or a S&EIR process is required to obtain EA. Listing Notice 1¹³ lists activities that require a BA process, while Listing Notice 2¹⁴ lists activities that require S&EIR. Listing Notice 3¹⁵ lists activities in certain sensitive geographic areas that require a BA process.

The regulations for both processes – BA and S&EIR – stipulate that:

- Public participation must be undertaken as part of the assessment process;
- The assessment must be conducted by an independent EAP;
- The relevant authorities must respond to applications and submissions within stipulated time frames;
- Decisions taken by the authorities can be appealed by the proponent or any other Interested and Affected Party (IAP); and
- A draft EMPr must be compiled and released for public comment.

GN R982 of 2014 (Appendix 1 - 5) sets out the procedures to be followed and content of reports compiled during the BA and S&EIR processes.

The NEMA National Appeal Regulations¹⁶ make provision for appeal against any decision issued by the relevant authorities. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 20 days of the date on which notification of the decision (EA) was sent to the applicant or IAP (as applicable). The applicant, the decision-maker, Interested and Affected Parties (IAPs) and organs of state must submit their Responding Statement, if any, to the appeal authority and the appellant within 20 days from the date of receipt of the appeal submission.

¹² GN R982 of 2014, as amended by GN 1816 of 2022

¹³ GN R983 of 2014, as amended by GN 517 of 2021

¹⁴ GN R984 of 2014, as amended by GN 517 of 2021

¹⁵ GN R985 of 2014, as amended by GN 517 of 2021

¹⁶ GN R993 of 2014, as amended by GN 205 of 2015

In June 2024, DFFE instructed Red Cap to submit separate applications¹⁷ for each of the three WEFs and to include the grid connection for the cluster in one of the WEF applications, noting the following conditions:

- Separate layout plans, EMPs, etc must be produced for each application;
- Separate specialist reports detailing key findings and conclusions must be produced for each of the four applications; and
- The public participation process for the projects can be combined providing this is clearly indicated in the title of all notification documents.

However, due to the nature of the project, specifically the layout of the connector ring grid connection, the grid connection is not easily aligned with one particular WEF. Submitting the grid connection application as a stand-alone application meant that this application would be assessed by DESTEA (as the CA), while the WEF applications were assessed by DFFE (as the CA). All parties agreed that it is preferable and indeed, good practice, for the four applications to be assessed in parallel by the same authority, so DESTEA motivated to DFFE for delegation of the grid connection project to DFFE. This was accepted by DFFE on 12 November 2024.

The proposed Renoster 1 Wind Farm includes activities that are listed in terms of the EIA Regulations, 2014. The applicable listed activities for the WEFs are summarised in Table 3-1, below, with an explanation of the relevance/applicability to the project.

Table 3-1: NEMA listed activities (2014) applicable to the WEF

No.	Listed activity	Applicability to the WEF infrastructure
Listing Notice 1 (GN R983)		
11	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.	Infrastructure will include three 132kV substations (including control, operation, workshop, storage buildings/areas) and high voltage (maximum up to 66kV) underground cables and overhead powerlines. Short sections of 132kV overhead powerlines may also be required. The site is located outside of urban areas.
12	The development of - (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100m ² ; or (iii) infrastructure or structures with a physical footprint of 100m ² or more, where such development occurs (a) within a watercourse; and (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.	The project will require the placement of linear infrastructure, i.e., internal access roads (including upgrading of watercourse crossings), underground cables and internal overhead power lines, with a combined physical footprint of more than 100m ² within a watercourse or within 32m of a watercourse. Certain interventions to address or prevent watercourse erosion at new or upgraded watercourse

¹⁷ In May 2024, SRK, on behalf of the applicant, applied to the DFFE in terms of Regulation 11(4) of the EIA Regulations for the submission of a single, consolidated application and assessment process for the entire Renoster Wind Farms project, with four separate EAs to be issued:

- One EA for each WEF and its associated infrastructure; and
- One EA for the grid connection, viz. Eskom switching stations, 132 kV powerlines, collector substations and 400 kV powerlines.

This request was denied.

No.	Listed activity	Applicability to the WEF infrastructure
		crossings that are required by the aquatic ecologist as part of the project may have a temporary damming effect with a surface water area of more than 100m ² at these locations.
14	The development and related operation of facilities or 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 m ³ or more but not exceeding 500 m ³ .	Fuel (and lubricants), electrolyte solution and powder cement will be required on site during various stages of the project. The combined storage capacity for all the above goods will exceed 80m ³ but be less than 500m ³ .
19	The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10m ³ from a watercourse.	Construction of internal roads, upgrades to existing roads (including upgrading of watercourse crossings) and laying of underground cables will require the excavation, removal or moving of material in excess of 10m ³ from watercourses.
24	The development of a road - (ii) with a road reserve wider than 13,5m, or where no reserve exists where the road is wider than 8m.	Where the existing road network is insufficient, new access roads will be required. A temporary road corridor of up to 20m will be impacted during the Construction Phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 8m wide road surface, with side drains on one or both sides of the road, where necessary.
28	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 will – (ii) occur outside an urban area, where the total land to be developed is bigger than 1 ha.	The land is currently used for agriculture. An area exceeding 1 ha will be converted to commercial/industrial use to accommodate WEF infrastructure.
48	The expansion of – (i) infrastructure or structures where the physical footprint is expanded by 100m ² or more, (a) within a watercourse; and (c) if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.	Existing roads and watercourse crossings will be upgraded where feasible. The total footprint of upgrades to existing roads and watercourse crossings will be in excess of 100m ² within a watercourse or within 32m of a watercourse.
56.	The widening of a road by more than 6m, or the lengthening of a road by more than 1km - (i) where the existing reserve is wider than 13,5m; or (ii) where no road reserve exists, where the existing road is wider than 8m.	Existing roads will be upgraded in preference to the construction of new roads, where feasible. A temporary road corridor up to 20m will be impacted during the Construction Phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 8m wide road surface, with side drains on one or both sides of the road, where necessary. Existing roads will be extended, where required, by more than 1km.

No.	Listed activity	Applicability to the WEF infrastructure
Listing Notice 2 (GN R984)		
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more.	The WEF will have a capacity of greater than 20 MW.
15	The clearance of an area of 20ha or more of indigenous vegetation.	More than 20ha of indigenous vegetation will be cleared for the placement of infrastructure and laydown areas.
Listing Notice 3 (GN R985)		
4	The development of a road wider than 4m with a reserve less than 13.5m – (b) Free State (i) outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas;	Where the existing road network is insufficient, new access roads will be required. A temporary road corridor of up to 20m will be impacted during the Construction Phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 8m wide road surface, with side drains on one or both sides of the road, where necessary. The project area overlaps with NPAES focus areas.
12	The clearance of an area of 300m ² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan – (b) Free State (iii) areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.	The placement of project infrastructure will require the clearance of more than 300m ² of indigenous vegetation within watercourses and wetlands, and within 100m from the edge of watercourses and wetlands.
14	The development of – (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10m ² ; or (ii) infrastructure or structures with a physical footprint of 10m ² or more; where such development occurs (a) within a watercourse; or (c) within 32m of a watercourse, measured from the edge of a watercourse; (b) Free State (i) outside urban areas in (bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas or ecosystem service areas [<i>sic</i> – it is assumed that the regulation is intended to read ‘ecological support areas’] as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; or	Where new roads that cross watercourses are required or where watercourse crossings are non-existent on existing roads, infrastructure with a physical footprint of 10m ² or more within watercourses and within 32m of watercourses will be developed within: i) NPAES Focus areas; ii) CBAs or ESAs; and/or iii) 5km of a declared protected area. Certain interventions to address or prevent watercourse erosion at new or upgraded watercourse crossings that are required by the aquatic ecologist as part of the project may have a temporary damming effect with a surface water area of more than 10m ² at these locations.

No.	Listed activity	Applicability to the WEF infrastructure
	(hh) areas within 10km from national parks or world heritage sites or 5km from any other protected area identified in terms of NEMPAA.	
18	The widening of a road by more than 4m, or the lengthening of a road by more than 1km – (b) Free State (i) outside urban areas in (bb) National Protected Area Expansion Strategy Focus areas; (hh) Areas within a watercourse or wetland; or within 100m from the edge of a watercourse or wetland	Existing roads and watercourse crossings will be upgraded where feasible and will need to be widened. A temporary road corridor up to 20m will be impacted during the Construction Phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 8m wide road surface, with side drains on one or both sides of the road, where necessary. The development will also involve the lengthening of existing roads, where required, by more than 1km. Some of these roads are located within: i) NPAES Focus areas; or ii) watercourses or within 100m of watercourses.
23	The expansion of - (i) dams or weirs where the dam or weir is expanded by 10m² or more; or (ii) infrastructure or structures where the physical footprint is expanded by 10m² or more; where such expansion occurs – (a) within a watercourse; or (c) within 32m of a watercourse, measured from the edge of a watercourse (b) Free State (i) outside of urban areas: (bb) National Protected Area Expansion Strategy Focus areas;	Existing watercourse crossings require upgrading resulting in the expansion of infrastructure or structures by 10m² or more within watercourses and within 32m of watercourses within NPAES Focus areas. Certain interventions to address or prevent watercourse erosion at new or upgraded watercourse crossings that are required by the aquatic ecologist as part of the project may have a temporary damming effect with a surface water area of more than 10m² at these locations.

Legal requirements for this project:

The proponent is obliged to apply for EA for these listed activities and to undertake an S&EIR process in support of the application, in accordance with the procedure stipulated in the EIA Regulations, 2014.

3.1.1.2 National Web Based Environmental Screening Tool

In terms of Regulation 16(1)(b)(v) of the NEMA EIA Regulation, 2014, an application for EA must include “the report generated by the national web based environmental screening tool” (Screening Tool). On 20 March 2020, notice was given that the submission of such a report is compulsory for all applications submitted after 4 October 2019 (GN R 960 of 2019).

The Screening Tool is based on broad scale national environmental sensitivity data and identifies specialist studies that may be required for the EIA. It is the responsibility of the EAP to confirm whether these specialist studies will be conducted or provide a motivation as to why the specialist studies will not be conducted as part of the EIA process.

The Screening Tool Report has informed the identification of specialist studies required for the EIA, and where applicable, motivation as to why certain specialist studies have not been scoped are provided in the Site Sensitivity Verification Report (SSVR) attached as Appendix C.

Legal requirements for this project:

The Screening Tool Report has informed the identification of specialist studies required for the EIA. The Screening Tool Report and a SSVR confirming the site sensitivities and thus the specialist studies proposed to inform the EIA process were submitted to DFFE with the EA Application form and are also attached as Appendix C.

3.1.1.3 Procedures for the Assessment and Minimum Criteria for Reporting

In terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes when Applying for EA (GN R320 and GN R1150 of 2020, as amended):

- The EAP and/or specialist(s) must verify (update) the findings of the Screening Tool based on desktop sources and a site inspection and compile a Verification Report;
- Where the Screening Tool indicates that a site is sensitive for an “Identified Environmental Theme”, a specialist assessment (for more sensitive sites) or Compliance Statement (for less sensitive sites) must be undertaken, depending on the verified sensitivity of the site;
- Specialists must ensure compliance with the Protocols for the assessment and minimum report content requirements of environmental impacts published in GN320 of 2020 and GN 1150 of 2020 for the various identified environmental themes; and
- Should the Screening Tool (or EAP) identify site sensitivities for disciplines which are not “Identified Environmental Themes” and specialist assessment is required, specialist reporting must comply with the requirements of Appendix 6 of the EIA Regulations, 2014.

Legal requirements for this project:

Content of specialist reports must comply with the relevant protocols for the assessment and minimum report content requirements of environmental impacts or Appendix 6 of the EIA Regulations, 2014. Evidence of compliance is provided in each specialist report.

3.1.1.4 Generic EMPr for substation and overhead transmission and distribution infrastructure

GN 435 of 2019 prescribes the use of a generic EMPr that must accompany applications for EA that include activities 11 and 47 in LN1 and activity 9 in LN2, and all associated listed or specified activities necessary for the realisation of such infrastructure. The generic EMPr prescribes and pre-approves generally accepted impact management outcomes and impact management actions. Separate generic EMPrs apply to 1) substation infrastructure for electricity transmission and distribution and 2) overhead electricity transmission and distribution infrastructure.

Legal requirements for this project

The Generic EMPrs for Substation Infrastructure Overhead Electricity Transmission and Distribution Infrastructure apply and will be included in the final EIA submission.

3.1.2 National Environmental Management: Biodiversity Act 10 of 2004

The purpose of the NEM:BA is to provide for the management and conservation of South Africa’s biodiversity and the protection of species and ecosystems that warrant national protection. The NEM:BA makes provision for the publication of bioregional plans and the listing of ecosystems and

species that are threatened or in need of protection. Threatened or Protected Species Regulations (2007), Guidelines for the determination of bioregions and the preparation and publication of bioregional plans (2009) and the Revised National List of Ecosystems that are Threatened and in Need of Protection (2022) have been promulgated in terms of NEM:BA.

A published bioregional plan is a spatial plan indicating terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. These areas are referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in terms of NEM:BA. Bioregional plans provide guidelines for avoiding the loss or degradation of natural habitat in CBAs with the aim of informing, EIAs and land-use planning (including Environmental Management Frameworks [EMFs], Spatial Development Frameworks [SDFs], and Integrated Development Plans [IDPs]).

Permits to carry out a restricted activity involving listed threatened or protected species or alien species may only be issued after an assessment of risks and potential impacts on biodiversity has been undertaken.

Legal requirements for this project:

The Free State Biodiversity Spatial Plan was approved and adopted by the Head of the Free State Department of Agriculture and Rural Development (DESTEA) on 16 October 2024 as an instrument informing decisions and priorities on biodiversity in the province. Impacts of the project on the biodiversity of the area and, in particular, on CBAs and ESAs, have been assessed.

3.1.3 National Water Act 36 of 1998

Water use in South Africa is controlled by the NWA. The executive authority is the Department of Water and Sanitation (DWS). The NWA recognises that water is a scarce and unevenly distributed national resource in South Africa. Its provisions are aimed at achieving sustainable and equitable use of water to the benefit of all users and to ensure protection of the aquatic ecosystems associated with South Africa's water resources. The provisions of the Act are aimed at discouraging pollution and wastage of water resources.

In terms of the Act, a land user, occupier or owner of land where an activity that causes or has the potential to cause pollution of a water resource has a duty to take measures to prevent pollution from occurring. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects, and to recover all reasonable costs from the responsible party.

Section 21 of the NWA specifies a number of water uses, including:

- (a) taking water from a water resource;
- (c) impeding or diverting the flow of water in a watercourse; and
- (i) altering the bed, banks, course or characteristics of a watercourse.

These water uses require authorisation in terms of Section 22 (1) of the Act, unless they are listed in Schedule 1 of the NWA, are an existing lawful use, fall under a General Authorisation (GA) issued in terms of Section 39 or if the responsible authority waives the need for a licence.

Legal requirements for this project:

The proposed project activities are likely to trigger water uses in terms of section 21 (a), (c) and (i) of the NWA. It is thus expected that a Water Use Licence (WUL) or GA will be required from the CA, in this case DWS. If required, Red Cap will make application in terms of the NWA.

3.1.3.1 Regulation Regarding the Procedural Requirements for Water Use Licence Applications and Appeals, 2017

The *Procedural Requirements for Water Use Licence Applications (WULAs) and Appeals* (Regulation 267, which came into effect on 24 March 2017), promulgated in terms of the NWA, prescribes the procedures and requirements for WULAs as contemplated in Section 41 of the NWA; as well as an appeal in terms of Section 41(6) of the NWA.

More specifically, the Regulations provide clarity on:

- Authority decision making timeframes;
- Pre-Application requirements;
- Consolidation of multiple WULAs into a single application;
- Technical report content requirements;
- Financial surety following issuing of WUA (e.g. WULA); and
- Procedure for public participation in terms of Section 41(4) of NWA.

In terms of Section 41 (6) of the NWA, an appeal can be lodged against any decision issued by the responsible authority. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 30 days of the date on which notification of the decision was received.

Legal requirements for this project:

Red Cap is obliged to apply for WUA for the water uses in terms of the NWA and to undertake a WULA process in accordance with the procedure stipulated in Regulation 267 under NWA. Comments submitted as part of this S&EIR process that relate to water use, including potential impacts of aquatic biodiversity, will also inform the application for WUA for the project.

3.1.4 National Heritage Resources Act 25 of 1999

The protection and management of South Africa's heritage resources are controlled by the NHRA. The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA). In terms of the Act, historically important features such as graves, trees, archaeological artefacts/sites and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection.

Section 38 of the NHRA requires that any person who intends to undertake certain categories of development must notify SAHRA at the very earliest stage of initiating such a development and must furnish details of the location, nature and extent of the proposed development. SAHRA has designed the South African Heritage Resources Information System (SAHRIS) database to assist the developer in providing the necessary information to enable SAHRA to decide whether a Heritage Impact Assessment (HIA) will be required.

Section 38 also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that, if such an assessment is deemed adequate, a separate HIA is not required. However, Section 38 (8) requires that the consenting authority (in this case the DFFE) ensures that the evaluation of impacts on the heritage resources fulfils the requirements of the relevant heritage resources authority, and that the comments and recommendations of the heritage resources authority are taken into account prior to the granting of the consent.

Section 38(1) of the NHRA specifies activities that trigger the need for the proponent to notify the heritage resources authority of the proposed development, in order for the heritage resources authority

to determine the need for further Heritage Assessment. The proposed Renoster 1 Wind Farm and associated infrastructure trigger a number of these activities, including:

- (a) Construction of a road, wall, powerline, canal or other similar form of linear development or barrier over 300 m in length;
- (c) Any development or activity that will change the character of a site (i) exceeding 5 000 m² in extent, (ii) involving three or more existing erven or subdivisions thereof; and
- (d) Rezoning of a site exceeding 10 000 m² in extent.

Legal requirements for this project:

The proposed project will include construction of roads and powerlines over 300 m in length, will lead to a change in character of the site.

The proponent is required to notify SAHRA of the proposed activities and undertake any assessments deemed necessary by SAHRA. The assessment of heritage, archaeological and paleontological impacts will be undertaken as part of the EIA process in terms of NEMA.

3.1.5 Subdivision of Agricultural Land Act 70 of 1970

SALA regulates the subdivision and rezoning of agricultural land¹⁸ and its use for any purpose other than agriculture. The Act has two main goals, namely:

- To disallow the change in land-use of high potential agricultural land; and
- To keep viable farm units intact.

Written consent must be obtained from the Minister of Agriculture, Land Reform and Rural Development (DALRRD) for the rezoning, subdivision or use for any other purpose of agricultural land.

Legal requirements for this project:

The proposed development involves the subdivision of agricultural land. As such, approval for the proposed development must be obtained by DALRRD in terms of this Act. Application for such authorisation falls outside of the scope of the S&EIR. DALRRD will however be consulted during the stakeholder engagement process.

3.1.6 Mineral and Petroleum Resources Development Amendment Act 28 of 2002

The Mineral and Petroleum Resources Development Amendment Act 28 of 2002 (MPRDA) governs the acquisition, use and disposal of mineral rights, and aims to provide equitable access to and sustainable development of the nation's mineral and petroleum resources.

Section 53 of the MPRDA requires that any entity planning an activity that could potentially sterilise mineral resources on the land surface must apply for approval from the Minister of Mineral Resources and Energy (the relative Regional Manager takes this decision).

Legal requirements for this project:

The proposed development has the potential to sterilise underground mineral and/or, petroleum resources at the site because it would restrict surface access for the extraction of these resources to

¹⁸ Agricultural land as defined in the Act excludes land situated in the area of jurisdiction of, amongst others, a municipal council, city council or town council.

a certain extent. Red Cap has therefore applied for approval for the development in terms of Section 53 of the MPRDA to the Free State Regional office of the DMRE.

3.2 Planning Policy Framework

This section discusses a number of key formal planning policies relevant to the project. The policies and plans briefly discussed below include regional and local development and spatial plans, including the:

- IRP for Electricity 2023;
- Strategic Integrated Projects (SIPs);
- Free State Provincial Growth and Development Strategy (FSPGDS) (2013);
- Free State Provincial Spatial Development Framework (FSPSDF) (2023/2024);
- Free State Provincial Biodiversity Spatial Plan (2024);
- IDPs for District and Local Municipalities, which formulate the specific needs in, and desirable developments for, municipalities; and
- SDFs for the District and Local Municipalities, which translate the aims of the IDP into a spatial dimension and, together with the IDP, aim to give effect to the national imperative to increase economic growth and promote social inclusion whilst ensuring that such growth is environmentally sustainable (DEA&DP, 2009).

3.2.1 Integrated Resource Plan 2024

The first Integrated Resource Plan 2010 (IRP) was approved by the (then) South African Department of Energy (subsequently DMRE) in March 2011, updated in 2019 and again in 2023 and 2024, with the Draft IRP 2024 released in November 2024. The IRP 2024 provides energy mix scenarios for the period up to 2030 and a second period up to 2050. It determines South Africa's long term electricity demand and the type, cost, timing and generating capacity required to meet this demand.

The Draft IRP 2024 identifies the preferred generation technologies required to meet the expected demand up to 2030, incorporating objectives such as reduced GHG emissions, reduced water consumption, affordable electricity, diversified electricity generation sources and localised and regional development. The envisaged energy mix includes coal, nuclear, natural gas, renewable energy and hydropower sources. Energy (battery) storage is deemed important in the South African context where the power system does not have the requisite storage capacity or flexibility required for the large increase in renewable energy.

By 2019, ~18 000 MW of new generation capacity had been committed (commissioned, procured or officially announced by the Minister of Energy), including ~6 500 MW procured under the REIPPPP, 9 600 MW by the Medupi and Kusile coal power plants and 1 005 MW from gas turbines (DoE, 2019).

The Draft IRP 2024 envisages that nuclear and gas will contribute significantly to the energy mix but also anticipates a rapid rollout of renewable energy, especially wind energy, facilitated by public and private procurement programmes. The IRP foresees the installation of more than 38 GW of new energy sources by 2030 ("committed capacity"), including 7.2 GW of wind energy sources, and the installation of an additional 130 GW of new energy sources by 2050, including up to ~76 GW of new wind energy generation (see Figure 3-1).

3.2.2 Strategic Integrated Projects

Sixty-two SIPs have been identified in terms of the National Infrastructure Plan (2050) to support economic development and address service delivery in South Africa. Each SIP comprises a large number of specific infrastructure components and programmes.

The National Infrastructure Plan (2050) identifies three energy SIPs (South African Government, n.d.):

- SIP 8: Green energy projects in support of the South African economy:
 - Support sustainable green energy initiatives particularly the procurement of renewable energy under the REIPPPP;
- SIP 9: Expansion of electricity generation to support socio-economic development;
 - Accelerate the construction of new electricity generation capacity in accordance with the IRP 2023 to meet the needs of the economy and address historical imbalances; and
 - Monitor implementation of major projects such as new power stations: Medupi and Kusile;
- SIP 10: Expansion of electricity transmission and distribution for all:
 - Expand the transmission and distribution network to address historical imbalances, provide access to reliable electricity for all and support economic development; and
 - Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

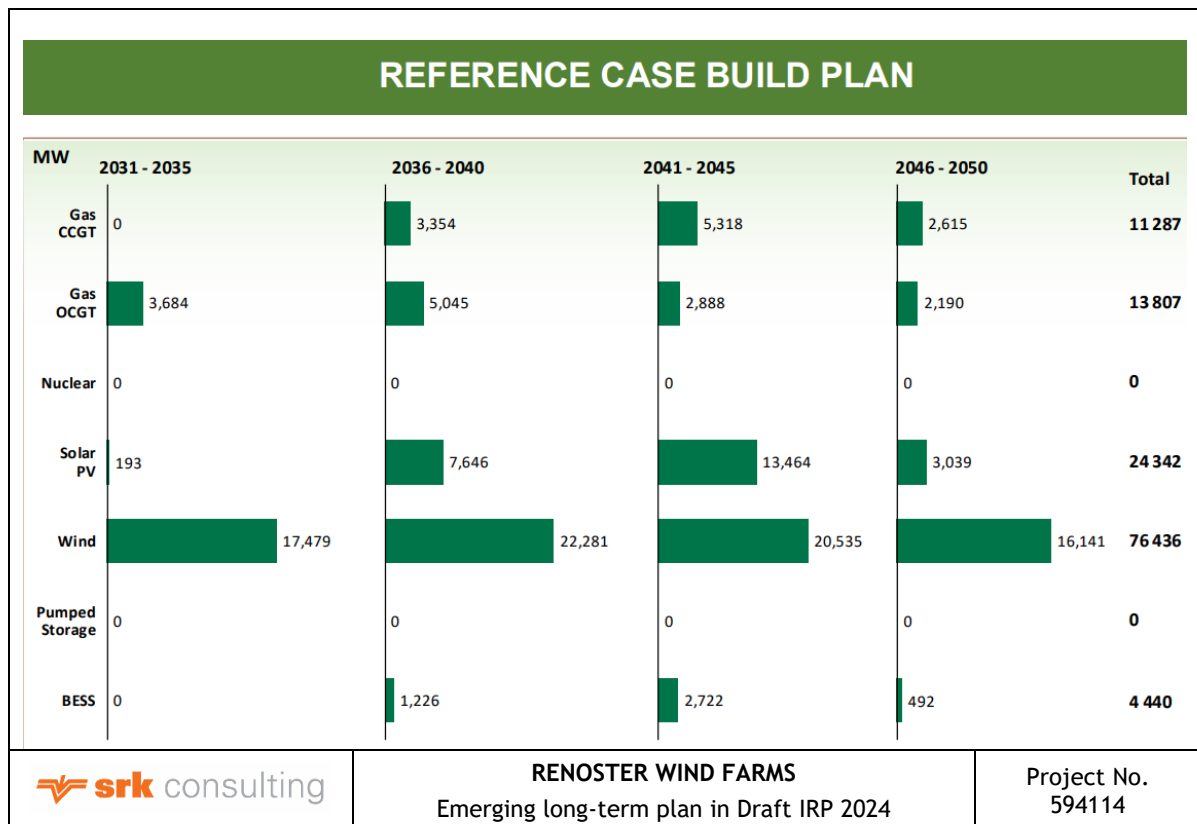


Figure 3-1: Emerging long-term plan in Draft IRP 2024

Source: (Department of Mineral Resources and Energy (DMRE), 2024)

These SIPs are part of South Africa's efforts to transition to a more sustainable energy mix, reduce reliance on coal, and promote the use of renewable energy sources. They are also aligned with the

broader goals of the National Infrastructure Plan (2050), which aims to strengthen the long-term strategic vision for infrastructure and tighten the thread from vision to action.

Red Cap Renoster 1 submitted an application for the registration of the Renoster 1 Wind Farm as a SIP to Infrastructure South Africa in August 2024 but has not yet been registered as a SIP.

3.2.3 Free State Provincial Growth and Development Strategy (2013)

The Free State Provincial Growth and Development Strategy (FSPGDS) is a guiding tool for future development in the Free State Province and identifies unemployment, poverty and inequality as the most significant challenges facing the province. The primary sector, specifically mining and agriculture, has contributed significantly to the provincial economy. Although employment in the agricultural sector has decreased at both a national and provincial level, the decrease in employment within the agricultural sector in the Free State is marginal. The liberalisation of agricultural policies, including the removal of subsidies to farmers and the reduction in import barriers, has led to an increased concentration of production and rapid mechanisation within the sector.

The FSPGDS reports that between Q3 2011 and Q2 2012, unemployment increased from 25.5% to 32%. This increase in unemployment was attributed to the decline in mining and the dominance of capital-intensive petro-chemicals sector in the province. The quality of education and skills shortages contribute to the province having proportionally more people employed in lower paid semi-skilled and elementary occupations.

The Free State Vision 2030 envisages an economy that encourages the development of new growth sectors and emphasises the importance of knowledge-based industries and the green economy. The FSGDS 2030 vision for the Free State Province is: *'to have a resilient, thriving and competitive economy that is inclusive with immense prospects for human development formation anchored on the principles of unity, dignity, diversity, equality and prosperity for all'*.

Various growth and development pillars have been identified in FSPGDS, including the following: *inclusive economic growth and sustainable job creation; improved quality of life; and sustainable rural development inclusive economic growth.*

3.2.4 Free State Provincial Spatial Development Framework

The FS PSDF is a spatial planning document that responds to and gives practical effect to the overarching objective stipulated in the National Spatial Development Framework as well as provincial development plans (e.g. IDPs and SDFs). The FS PSDF together with the FSGDS is a critical instrument in guiding the use of resources of the province in a manner that will ensure sustainable outcomes based on the needs and priorities identified by the province.

Previous PSDFs were released in 2007 and 2014. The Free State Provincial Government has commissioned an updated PSDF, which is currently in the second phase (of six) of preparation.

The key objectives of the PSDF include:

- supporting the district and local municipalities to develop SDFs;
- guiding the investment of public resources; and
- facilitating cross-boundary cooperation and coordination between District and Local municipalities, adjoining provinces and Lesotho.

3.2.5 Free State Province Biodiversity Spatial Plan (2024)

The Free State Province Biodiversity Spatial Plan (FSPBSP) was published in October 2024 and is the province's first comprehensive compilation of terrestrial biodiversity and ecological data. The

FSPBSP identifies critical areas for biodiversity preservation that must be protected to prevent loss. The FSPBSP offers two primary outputs:

1. A map showing various terrestrial categories (Protected, CBAs, ESAs, Other, and Degraded); and
2. Land use guidelines for these categories.

3.2.6 Fezile Dabi District Municipality Integrated Development Plan (2022 – 2027)

The vision of the FDDM IDP is to *'improve the lives of citizens and progressively meet their basic, social and economic needs, thereby restoring community confidence and trust in government'*.

The FDDM IDP is aligned with various national and provincial plans, including the FSPGDS. Three strategic goals were identified in the FDDM IDP, namely to:

- Deliver basic services and create conditions for decent living;
- Build capable institutions and administration; and
- Stimulate local economic growth and ensure social cohesion.

The IDP recognises the importance of basic infrastructure in creating an environment conducive for attracting private sector investments and local economic growth. Development of renewable energy projects will contribute to municipal finances and will indirectly support the FDDM goals of delivery of basic services and stimulating local economic growth.

3.2.7 Ngwathe Local Municipality Integrated Development Plan (2021- 2026)

The Ngwathe LM IDP vision is for *'a viable municipality with inclusive economy, sustainable development and quality services for all'* and the mission statement is *"to provide affordable and quality municipal services and address triple challenges of poverty, unemployment and inequality, and promote sustainable development through cooperative, strategic partnerships and innovation"*.

In order to achieve the mission and vision for the Ngwathe LM, numerous strategic objectives have been adopted, including, *inter alia*, ensuring sustainable provision of basic service delivery, environmental sustainability and stimulation of economic growth.

Development of renewable energy projects will contribute to municipal finances and indirectly supports the Ngwathe LM goals of sustainable provision of electricity to the LM.

4 Environmental Process

NEMA lists a number of principles that apply to the actions of organs of state and that also serve as reference for the interpretation of environmental legislation and administration of environmental processes. The principles most relevant to environmental assessment processes and projects for which authorisation is required are summarised below.

Principles relevant to the EIA process:

- Adopt a risk-averse and cautious approach;
- Anticipate and prevent or minimise negative impacts;
- Pursue integrated environmental management;
- Involve stakeholders in the process; and
- Consider the social, economic and environmental impacts of activities.

Principles relevant to the project:

- Place people and their needs at the forefront of concern and serve their needs equitably;
- Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
- Assume responsibility for project impacts throughout its life cycle; and
- Polluter bears remediation costs.

In accordance with the IEM Information Series (DEAT, 2004), an open, transparent approach, which encourages accountable decision-making, has been adopted.

The underpinning principles of IEM require:

- Informed decision-making;
- Accountability for information on which decisions are made;
- A broad interpretation of the term “environment”;
- An open participatory approach in the planning of proposals;
- Consultation with interested and affected parties;
- Due consideration of alternatives;
- An attempt to mitigate negative impacts and enhance positive impacts of proposals;
- An attempt to ensure that the social costs of development proposals are outweighed by the social benefits;
- Democratic regard for individual rights and obligations;
- Compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- The opportunity for public and specialist input in the decision-making process.

This S&EIR process complies with these principles through its adherence to the EIA Regulations, 2014, which set out clear requirements for, *inter alia*, impact assessment and stakeholder involvement (see Chapter 5), and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

In addition, reference is made to relevant guidelines published by the (then) Department of Environment Affairs (DEA) and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP¹⁹), including:

- DEA&DP's EIA Guideline and Information Document Series (DEA&DP, 2013), which includes guidelines on Generic ToR for EAPs and Project Schedules, Public Participation, Alternatives, Need and Desirability, Exemption Applications and Appeals;
- DEA's Public Participation Guideline in terms of NEMA EIA Regulations (DEA, 2017a); and
- DEA's Guideline on Need and Desirability (DEA, 2017b).

The CA for the application for EA of the Renoster 1 Wind Farm project is DFFE.

The regulated timeframes for the formal S&EIR prescribed by NEMA commence on submission of an application for EA. However, because the formal S&EIR process is constrained by rigid timeframes, a significant portion of the detailed investigations required to inform layout and design has taken place prior to the commencement of the formal S&EIR process. Some specialist studies (e.g. Avifauna and Bats) require a 12-month monitoring period, which cannot be accommodated within the formal S&EIR process. In addition, Red Cap require that a preliminary impact assessment of the preliminary layout is undertake prior to commencement of the formal S&EIR process (see Section 4.1).

The environmental process that has been adopted for the Renoster 1 Wind Farm assessment comprises the following phases (Figure 4-1):

- Pre-Application Phase;
- Scoping Phase (**current phase**);
- Impact Assessment Phase; and
- Authority Decision-making and Appeals Period.

4.1 Pre-Application Phase

Prior to the formal commencement of the EIA process, during the Pre-Application Phase, a comprehensive integrated sensitivity analysis was undertaken to inform the preliminary layout, specialist assessments were initiated and preliminary stakeholder consultation was undertaken.

4.1.1 Integrated Sensitivity Analysis

Prior to commencement of the formal S&EIR process, Red Cap, in consultation with SRK, appointed a multidisciplinary team of specialists (Table 4-1) to assess the overall sensitivity of the Renoster Wind Farms Development project area, with the aim of ensuring that the principles of IEM and sustainable development set out in NEMA are integral to the development of the proposed project layout. The expertise of a broad range of environmental and technical specialists has been drawn on from early in project feasibility studies to ensure that the final design is as environmentally desirable and practicable as possible. By incorporating environmental and social constraints into the project design

¹⁹ Where no specific guidelines are available from DFFE (previously DEA) for a specific aspect of the environmental process, reference is made to DEA&DP guidelines.

from its earliest stages, avoidance and minimisation of impacts in the design reduces the risk of fatal flaws emerging later in the process. Landowners and other stakeholders have been consulted throughout to integrate their needs into the design. The intention is that an environmentally, socio-economically and technically sound development proposal is then taken through to the EIA.

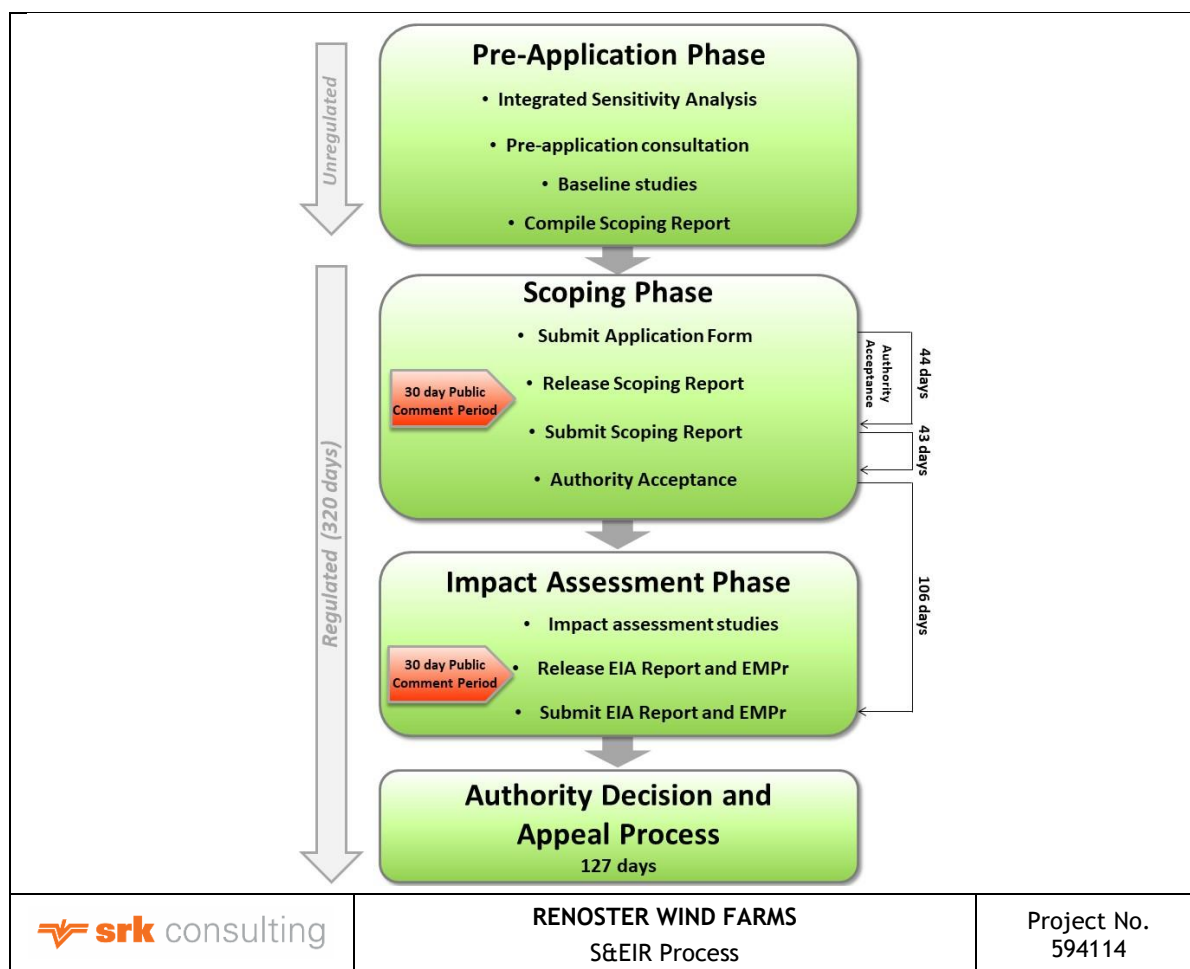


Figure 4-1: S&EIR Process

Table 4-1: Sensitivity study specialist team

Discipline	Company	Specialist
<i>Hydrogeology*</i>	Geoss	<i>Hardy Luttig</i>
Agriculture and Soils	SoilZA	Johann Lanz
Freshwater Ecology	Liz Day Consulting	Liz Day
Terrestrial Ecology	3Foxes Biodiversity Solutions	Simon Todd
Avifauna	AfriAvian Environmental	Albert Froneman
Bats	Animalia Consultants	Werner Marais
Heritage and Archaeology	Asha Consulting	Jayson Orton
Palaeontology	Marion Bamford Consulting	Marion Bamford
Visual and Landscape	SLR Consulting	Kerry Anne Schwartz
<i>Shadow Flicker</i>	<i>Metrica</i>	<i>Martin Stevenson</i>
<i>Socio-Economic</i>	<i>Independent Economic Researchers</i>	<i>Hugo van Zyl</i>
Noise	Environmental Acoustic Research	Morné de Jager
<i>Traffic</i>	<i>Zutari</i>	<i>David Stephenson</i>

*Desktop studies indicated in italics.

The objectives of the **Pre-Application Phase** are to:

- Identify appropriate specialist studies, taking into account the output of the national screening tool prescribed by Regulation 16(1)(b)(v) of the NEMA EIA Regulation, 2014;
- Develop ToR for specialist studies and appoint specialists to commence Specialist Assessments;
- Identify stakeholders, including neighbouring landowners/residents and authorities;
- Complete the Integrated Sensitivity Analysis exercise to inform the development of a preliminary layout;
- Document and contextualise the biophysical baseline conditions of the study area and the socio-economic conditions of affected communities;
- Report on the specialist assessment of potential environmental impacts and benefits predicted to arise from the proposed project based on the preliminary layout and recommend mitigation measures to avoid and/or address impacts; and
- Compile a Scoping Report describing the affected environment and present a preliminary assessment of the potential environmental impacts and benefits arising from the proposed project based on the preliminary layout, for further investigation in the Impact Assessment Phase.

4.1.2 Sensitivity Mapping

Specialists undertook a desktop-based study, documenting the environmental baseline of the Renoster Wind Farms Development project area from available literature and data sources. Thereafter, specialists designated No-Go (*Very High*), *High*, *Medium*, and *Low* sensitivity areas across the project area according to a set of defined criteria (Table 4-2), to facilitate consistent integration of specialist studies in the design.

Table 4-2: Sensitivity ratings

No Go	Areas or features that are considered of such sensitivity or importance that any adverse effects upon them may be regarded as a fatal flaw.
High	Areas or features that are considered to have <i>High</i> sensitivity. Development in these areas must be limited and must remain within any acceptable limits of change as determined by the specialist. Development should also comply with any other restrictions or mitigation measures identified by the specialist.
Medium	<i>Medium</i> sensitivity areas are considered to be developable; however, the nature of the effects should remain within any acceptable limits of change as determined by the specialist. Development should also comply with any other restrictions or mitigation measures identified by the specialist.
Low	Low sensitivity areas that are considered to be developable however specialists may still wish to define acceptable limits of change should they deem this necessary.

Different infrastructure types will result in different impacts on the environment. For example, the placement of any infrastructure with a footprint (e.g. a turbine, pylon, road or building) in or near a sensitive watercourse would result in a significant impact. However, with appropriate controls in place, overhead lines could potentially be strung over the same watercourse without any impact on the watercourse. As such specialists were requested to compile sensitivity maps for four different infrastructure types, namely:

- Turbines;
- Roads and underground cables;
- Pylons and internal overhead lines, and
- Buildings (including substations, BESSs, construction camp/yards, etc).

An example of the specialist output (for Freshwater Ecology) is provided in Figure 4-2.

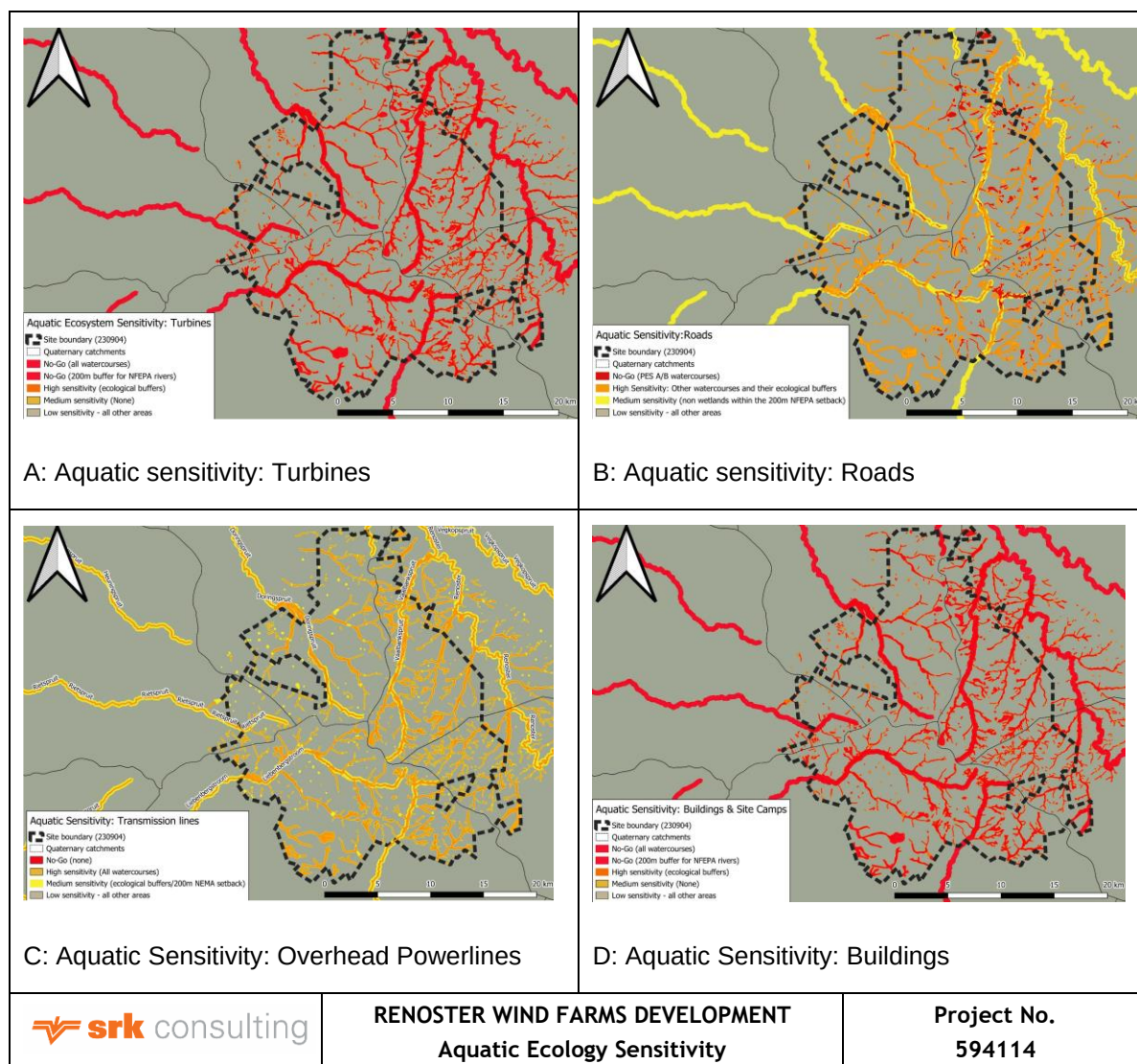


Figure 4-2: Example of specialist sensitivity mapping for the cluster

4.1.3 Specialist Integration Workshop

Following combined ground-truthing site visits, a multi-disciplinary specialist integration workshop was held with relevant specialists²⁰ to interrogate and refine the identified impacts and sensitivities, collaborate and build consensus between the specialists. The objectives of the workshop were to:

²⁰ Geohydrology, Noise, Shadow Flicker and Socio-economic specialists were not in attendance as these specialist studies do not require direct integration with other specialist fields. Adequate spatial and written information was however submitted by these specialists ahead of the workshop for consideration. The Avifaunal specialist was unable to attend but has liaised closely with the project design team to ensure that all necessary considerations were included in discussion and inspected the site in conjunction with the Aquatic Biodiversity specialist at a later stage to integrate the findings of these two specialist fields.

- a. Present the desktop baseline findings of the site, which had been ground-truthed by each specialist during this and/or previous or future site visits;
- b. Present the criteria specialists used to identify and establish their specialist specific *No-Go* areas and the *High*, *Medium* and *Low* sensitivity developable areas;
- c. Discuss planning constraints and existing infrastructure setbacks or *No-Go* areas originally identified by Red Cap;
- d. Present, discuss and refine synergies and overlaps between the specialists' sensitive areas/features (e.g. watercourses often correspond to habitat for bats (foraging and navigation) and certain bird species). For consistency in this case, the latest aquatic ecosystem layer was refined by the aquatic specialist and disseminated to all other specialists to inform their assessments (particularly bats) and ensure consistency across the studies; and
- e. Obtain input from the project engineer regarding site conditions and technical design constraints.

4.1.4 Iterative Design Process

Following the workshop and site inspection, specialists provided revised spatial datasets depicting their *No-Go*, *High*, *Medium* and *Low* sensitivity developable areas for the different infrastructure types. A consolidated *No-Go* map was derived for each infrastructure type, namely turbines (Figure 4-3), pylons (and new pylon access roads) (Figure 4-4), overhead powerlines (Figure 4-5), new roads and off-road underground cables (Figure 4-6) and buildings (Figure 4-7).

The consolidated *No-Go* Maps and the additional modelling outputs were used to inform the development of a preliminary layout (Figure 4-8) that aims to maximise the potential energy outputs of the site factoring in technical and environmental constraints. The layout aimed to avoid Very High (*No-Go*) and High sensitivity areas entirely or, where this was not possible due to technical or landowner constraints, to minimise intrusion into those High sensitivity areas by the considered placement of infrastructure. The current (preliminary) layout makes provision for 69 turbines, three on-site substations and three BESSs, associated internal overhead powerlines, roads and underground cabling (described in detail in Section 2.3.2). This preliminary layout (Figure 2-7) was provided to the full EIA specialist team as the basis for their preliminary Specialist Impact Assessment (IA) Reports, as presented in this Scoping Report (see Chapter 7).

Throughout the EIA process, the consolidated *No-Go* maps and project layout will continue to be updated as additional information becomes available from specialists, particularly from the Bats monitoring programme. Landowner and other stakeholder concerns and interests raised through the EIA process will also be taken into account in refining the design. A revised layout will be assessed by all specialists in the Impact Assessment Phase.

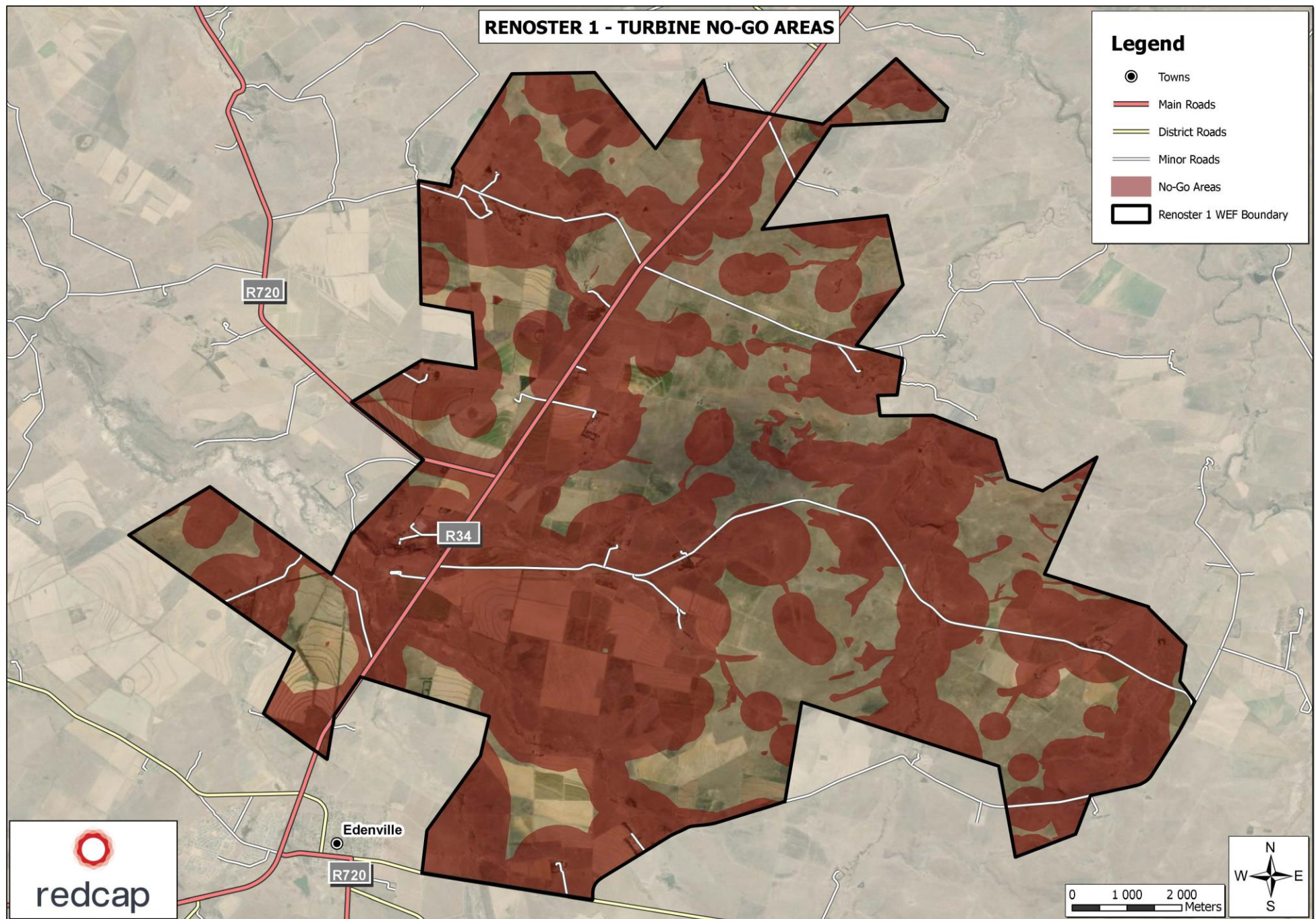


Figure 4-3: Renoster 1 Wind Farm Turbine Consolidated No-Go Map

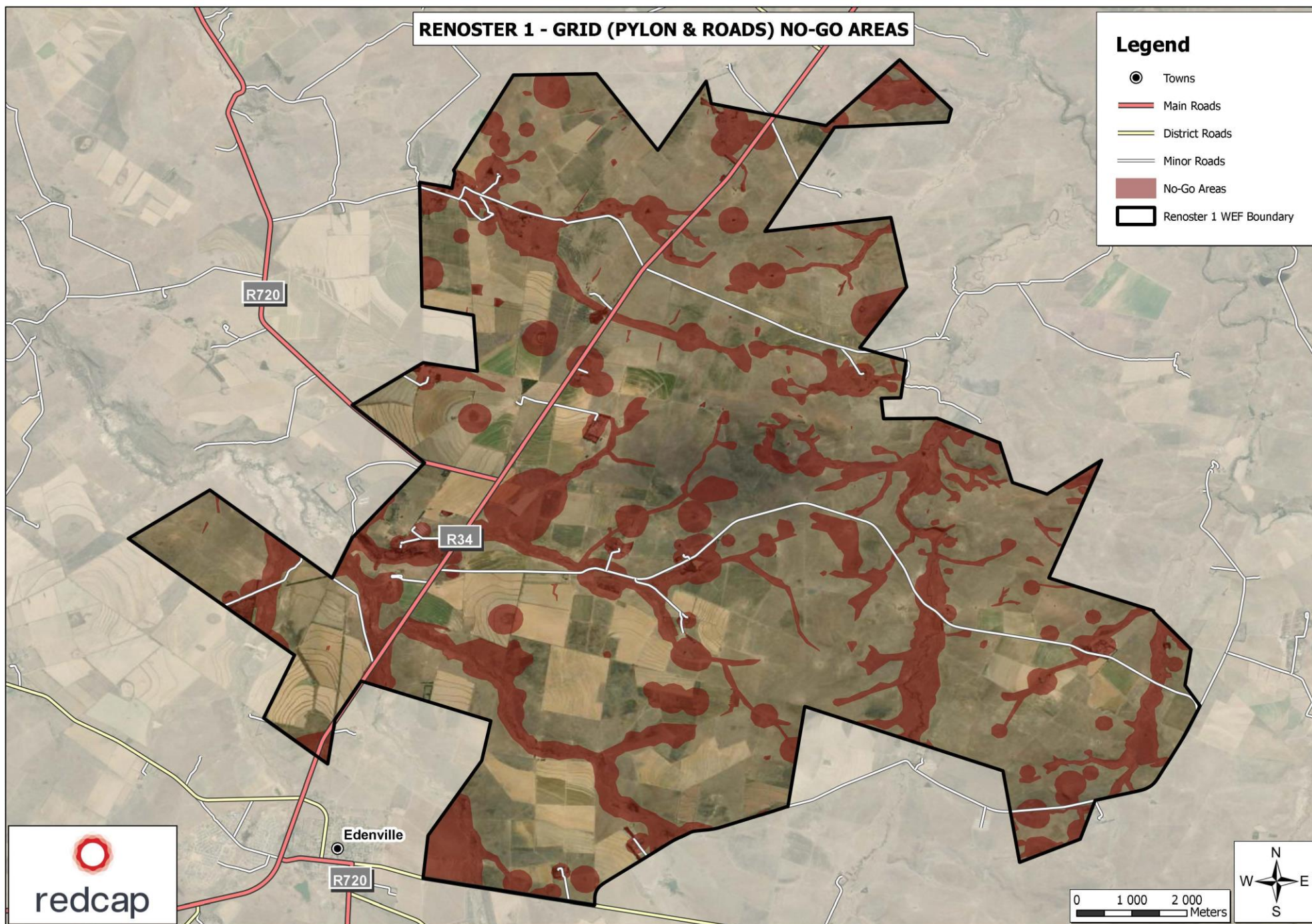


Figure 4-4: Renoster 1 Wind Farm Pylons and New Pylon Access Roads Consolidated No-Go Map

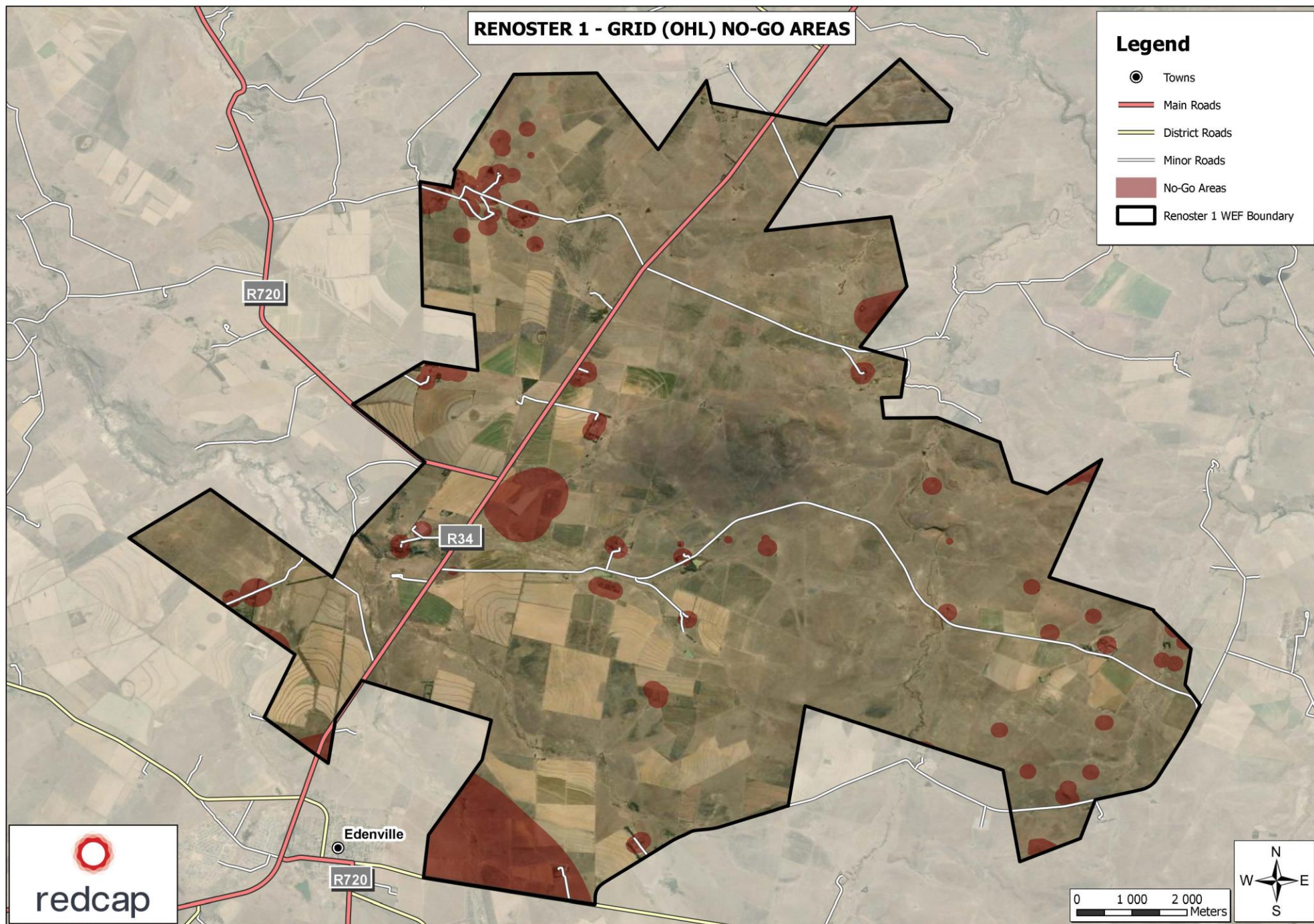


Figure 4-5: Renoster 1 Wind Farm Overhead Powerlines Consolidated No-Go Map

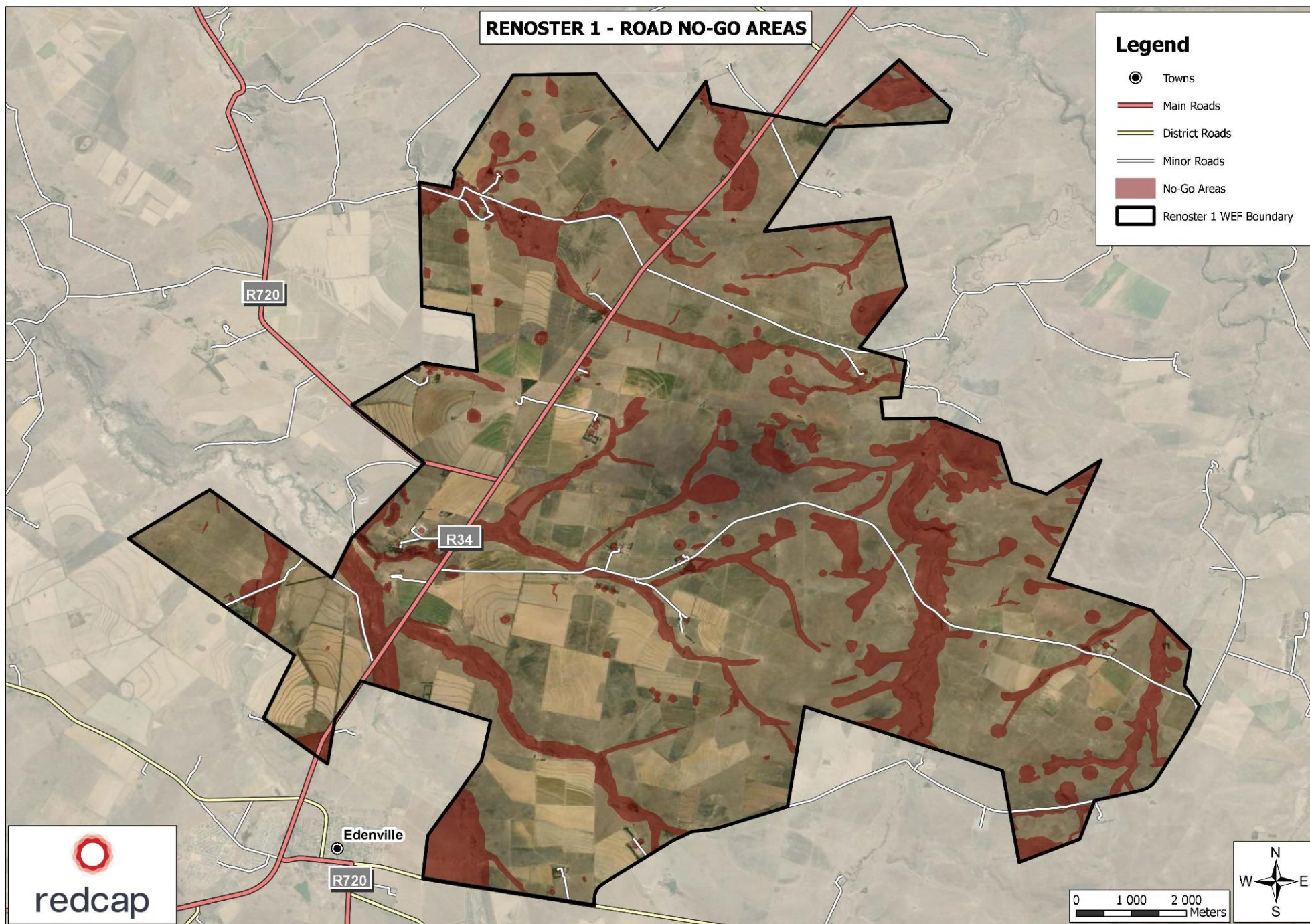


Figure 4-6: Renoster 1 Wind Farm New Roads and Underground Powerlines Consolidated No-Go Map

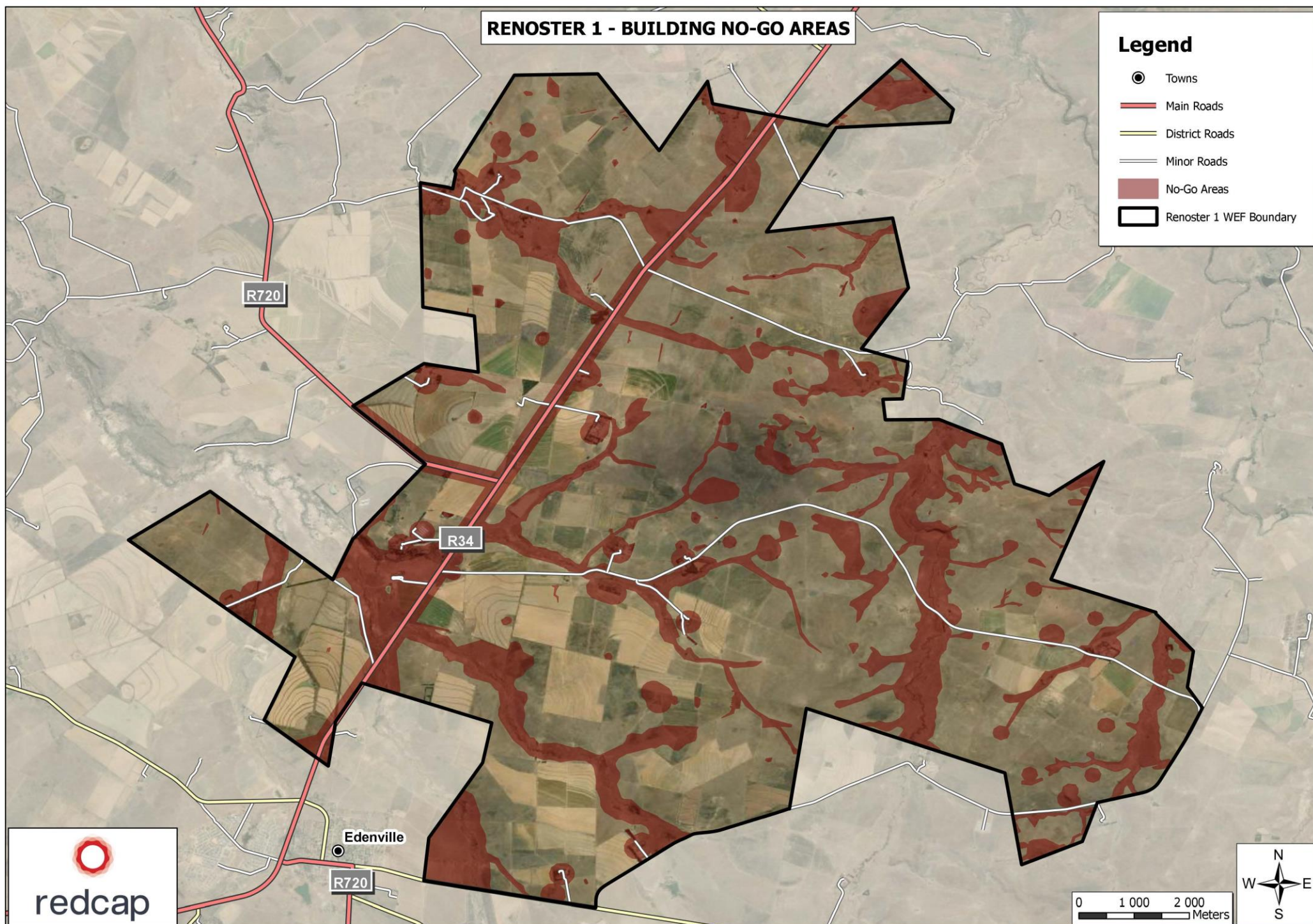


Figure 4-7: Renoster 1 Wind Farm Buildings Consolidated No-Go Map

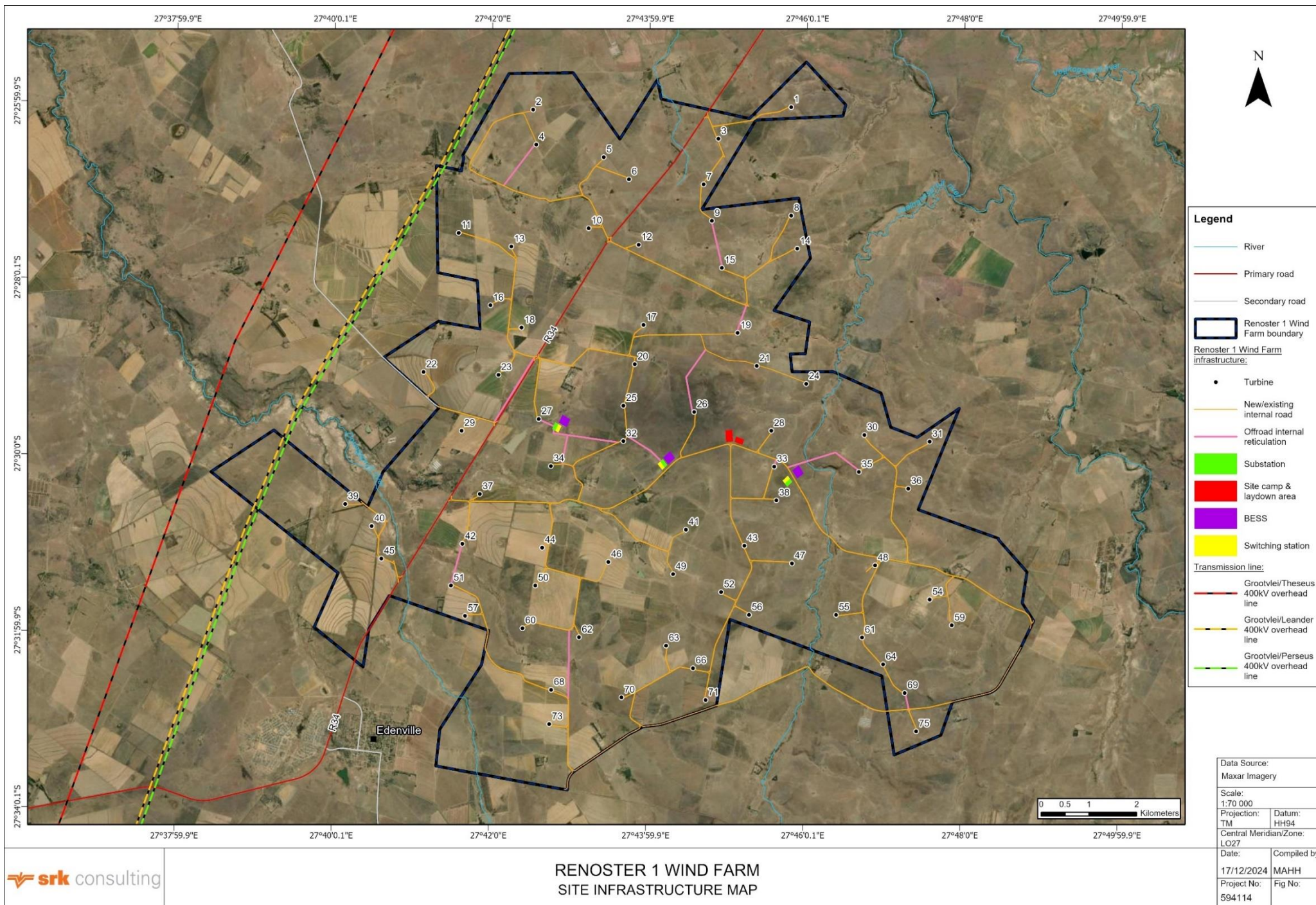


Figure 4-8: Renoster 1 Wind Farm: Preliminary Layout

4.1.4.1 Pre-Application Phase Stakeholder Engagement

Stakeholder engagement undertaken during this phase is described in Chapter 5. This included:

- Placement of notices around the perimeter of the site and in Edenville;
- Distribution of a Background Information Document (BID) in English, Afrikaans and Sesotho in the Edenville community and to all stakeholders on the preliminary database;
- Advertisement of the project and EIA process in two local publications and on local landowner WhatsApp groups, requesting IAPs register on the database; and
- Focus group meetings with local landowners and authorities.

Comments and feedback received during this phase are summarised in Table 5-3.

4.1.4.2 Specialist Assessments

The S&EIR process is, in part, informed by a suite of specialist studies. The following specialists were appointed to undertake Specialist Assessments (Table 4-3):

Table 4-3: Specialist baseline and impact studies

Specialist Study/Theme	Specialists	Organisation
Geohydrology	Dale Barrow/Hardy Luttig	Geoss South Africa
Land Capability and Agricultural Potential	Johann Lanz	SoilZA
Aquatic Biodiversity	Liz Day	Liz Day Consulting
Terrestrial Biodiversity <i>including</i> : • Plant Species • Animal Species	Simon Todd	3Foxes Biodiversity Solutions
Avifauna <i>including</i> : • Animal Species • Vultures	Albert Froneman Megan Loftie-Eaton	AfriAvian Environmental
Bats	Werner Marais	Animalia Consultants
Socio-Economics	Hugo Van Zyl	Independent Economic Researchers
Archaeology and Heritage	Jayson Orton	Asha Environmental
Palaeontology	Marion Bamford	Marion Bamford Consulting
Landscape/Visual	Kerry Schwartz	SLR Consulting
Shadow Flicker	Martin Stevenson	Metrica (UK)
Noise	Morné de Jager	Enviro Acoustic Research cc
Transport	David Stevenson/Nigel le Grange	Zutari
Climate Change	Robbie Louw	Promethium Carbon

General ToR were issued to all specialists to:

- Maintain consistency between the various specialist studies with regard to quality, and the presentation and content of reports;
- Ensure the studies meet the content requirements prescribed by relevant legislation; and
- Ensure that the studies are comprehensive and provide relevant information for the EIA.

The general ToR and principal objectives for each specialist study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the Construction and Operational Phases, followed by a narrative description of each impact and a presentation of the assessment impact, using the prescribed impact rating methodology (Section 7.2);
- Discuss the adequacy of the iterative and integrated design process as a means of considering and refining layout alternatives for the project;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

Specialists were required to ensure compliance with the DEFF/DFFE “Protocols for the assessment and minimum report content requirements of environmental impacts” published in Government Notice (GN) 320 of 2020 and GN 1150 of 2020. Specialists undertaking studies for themes for which assessment protocols are not prescribed were instructed to consult Appendix 6 of the EIA Regulations 2014, as amended, which stipulates the requirements for specialist studies in these instances.

Specialist reports were required include a section demonstrating compliance with specialist study reporting requirements as prescribed by Appendix 6 of the EIA Regulations, 2014 or “Protocols for the assessment and minimum report content requirements of environmental impacts” published in Government Notice (GN) 320 of 2020, GN 1150 of 2020 and GN 3717 of 2023, whichever is relevant.

As required by the EIA Regulations, specialists completed a declaration of independence and included it in their reports. In addition, specialists included copy of their Curriculum Vitae (CV), and proof of professional registration (where applicable).

Note: Where specific ToR are applicable to individual specialist assessments, these are presented in the corresponding sections in Chapter 7.

Specialist deliverables included:

- Site Sensitivity Verification Reports in terms of GN 320 of 20 March 2020 and/or GN 1150 of 30 October 2020 and GN 3717 of 28 July 2023, where applicable; and
- Specialist Assessment Reports OR Compliance Statements (as applicable) in terms of 9 May 2020²¹ and subsequent amendments to these protocols issued on 30 October 2020²², and 28 July 2023²³. OR in compliance with Appendix 6 of the EIA Regulations, 2014, as amended if no protocols apply to the discipline.

²¹ GN 320 of 2020

²² GN 1150 of 2020

²³ GN 3713 of 2023

4.2 Scoping Phase

As described in Section 4.1.1, a number of activities that are normally only undertaken during or after the Scoping Phase were initiated or completed during the Pre-Application Phase. In particular, specialist baseline studies were completed prior to the commencement of the Scoping Phase. This was to inform project design from an early stage in the process and ensure that specialist studies accounted for seasonal sampling and, in some cases, undertook a full 12 months of monitoring without compromising the legislated EIA timeframes. As a result, specialists were appointed and their ToR issued early in the Pre-Application Phase. The specialist ToR are presented in Section 4.1.4.2, and while SRK is confident that these ToR are comprehensive and thorough, should stakeholders raise any concerns regarding the assessments undertaken, there is an opportunity to supplement the ToR and address any shortcomings in the Impact Assessment Phase.

As noted in Section 4.1, specialists also assessed the impacts of the preliminary design in their reports and the findings are reported on in this Scoping Report. Again, while this is not required in the Scoping Phase, this approach has been adopted to avoid and/or minimise impacts through informed design early in the project feasibility studies. Where this was not possible or new information has come to light during the course of specialists compiling their Scoping Reports, further design modifications are recommended at this stage.

This approach is in accordance with the assertion in NEMA that “a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions”. This approach has been broadly adopted throughout the environmental process, and specifically applied where specialists were instructed to assess the “worst-case scenario” including the total number of potential turbine locations and an envelope covering all possible turbine dimensions.

The objectives of the **Scoping Phase** are to:

- Inform stakeholders of the proposed activity, feasible alternatives and the S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and build capacity amongst stakeholders so that they may actively and meaningfully participate;
- Document and contextualise the biophysical baseline conditions of the study area and the socio-economic conditions of affected communities;
- Assess the potential environmental and socio-economic impacts of the project based on the preliminary layout;
- Identify environmental and social mitigation measures to avoid and/or address the impacts assessed for inclusion in the revised layout;
- Obtain contributions from stakeholders, including relevant authorities, the public and local communities, identify any issues and concerns associated with the proposed project and address their relevant issues and concerns in the Scoping Report;
- Develop a Plan of Study for the EIA; and
- Submit a Scoping Report to the relevant authorities (in this case, DFFE and SAHRA).

The formal S&EIR process commenced with the submission of Application for EA for the proposed Renoster 1 Wind Farm to the DFFE, which was submitted together with this Scoping Report (see Section 4.4).

4.3 Impact Assessment Phase

If the Final Scoping Report is accepted, the Impact Assessment Phase will commence, which will comprise the compilation of an Environmental Impact *Assessment* Report (*EIA Report*) and EMPs. These reports will be informed by the Plan of Study for the EIA that is presented in the Scoping Report (see Section 7.18).

The preliminary layout will be revised and finalised based on recommendations in the Final Scoping Report, which includes both specialist recommendations and input from stakeholders. Specialists will be required to update their assessments based on the revised layout and these findings will be presented in the EIA Report. Mitigation measures will be consolidated and presented in the EMPs.

The aims of the **Impact Assessment Phase** are to:

- Inform and obtain contributions from stakeholders, including relevant authorities, the public and local communities and address their relevant issues and concerns;
- Continue to build capacity amongst stakeholders during the S&EIR process so that they may actively and meaningfully participate;
- Update the descriptions of the biophysical baseline conditions of the study area and the socio-economic conditions of affected communities based on completed specialist baseline studies;
- Assess in detail the potential environmental and socio-economic impacts of the project based on the revised layout;
- Identify environmental and social mitigation measures to avoid and/or address the impacts assessed; and
- Develop and/or amend environmental and social management plans based on the mitigation measures developed in the EIA Report and EMP.

4.4 Submission of Applications

Although various environmental authorisations, permits or licences are required before the proposed project may proceed, the regulatory authorities are committed to the principle of cooperative governance and in order to give effect to this principle, the S&EIR process informs all applications. An EIA Report will be compiled and will be submitted to the DFFE in support of the application for EA of NEMA listed activities for the Renoster 1 Wind Farm project²⁴.

Some application forms must be submitted at the outset of the S&EIR process (e.g. in terms of the EIA Regulations and NHRA) while licences in terms of the NWA will only be applied for by Red Cap. The required environmental authorisations/approvals and their status are listed in Table 4-4 – this list

²⁴ Note that separate EIA applications are being lodged concurrently for the Renoster 2 and Renoster 3 WEFs and the Renoster Grid Connection.

is not necessarily intended to be exhaustive but rather an indication of some of the other environmental approvals required for the project.

Table 4-4: Environmental authorisations, environmental permits and environmental licences required for the project

Application	Authority	Status
EA	DFFE	Application was submitted to the DFFE on 27 January 2025 in compliance with Section 16 of the EIA Regulations, 2014. Reference number <u>14/12/16/3/3/2/2668</u> was issued <u>by DFFE</u> for the Renoster 1 Wind Farm <u>project</u> .
Heritage Application	SAHRA	Application was submitted via the SAHRIS on 27 January 2025 (<u>case ID 24455</u>).
WUL	DWS	Application will be submitted by Red Cap <u>prior to the conclusion of the EIA Phase</u> .

5 Stakeholder Engagement

Stakeholder engagement forms a key component of the S&EIR process and is undertaken in accordance with Chapter 6 of the EIA Regulations, 2014 and the Protection of Personal Information Act 4 of 2013 (POPIA). The objectives of stakeholder engagement are outlined in this section, followed by a summary of the approach to be followed.

As of 1 July 2021, sections of the POPIA, which aims to promote protection of personal information, came into effect. The EIA Regulations, 2014 require, inter alia, transparent disclosure of registered stakeholders and their comments. In terms of the EIA Regulations, 2014, stakeholders who submit comments, attend a meeting or request registration in writing are deemed registered stakeholders who must be added to the project's Registered Stakeholder Database with their contact details. Therefore, **registered stakeholders are deemed to give their consent for relevant information (including name and contact details) to be processed and disclosed, in fulfilment of the requirements of the EIA Regulations, 2014 and the National Appeal Regulations, 2014.**

5.1 Objectives and Approach to Stakeholder Engagement

The overall aim of stakeholder engagement is to ensure that all IAPs have adequate opportunity to provide input into the process and raise their comments and concerns. More specifically, the objectives of stakeholder engagement are to:

- Identify IAPs and inform them about the proposed development and S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify relevant issues and concerns; and
- Provide stakeholders with the opportunity to review documentation and assist in identifying mitigation and management options to address potential environmental issues.

The Renoster 1 Wind Farm stakeholder engagement will be run contemporaneously with the other Renoster Wind Farms projects (Renoster 2 *Wind Farm*, Renoster 3 *Wind Farm* and the Renoster Grid Connection) to provide stakeholders with an opportunity to simultaneously review and comment on the Renoster 1 Wind Farm and the other WEF projects and associated grid connection in the cluster.

5.2 Stakeholder Engagement Activities

The activities undertaken during the Pre-Application and Scoping Phases of the EIA process are outlined in Table 5-1 and Table 5-2, respectively.

Table 5-1: Stakeholder engagement undertaken during the Pre-Application Phase

Task	Description of task
Hold Pre-Application Meeting with DFFE	A Pre-Application meeting with the DFFE was held on 13 March 2024 to discuss the proposed approach to the S&EIR processes, specialist studies and stakeholder engagement with the CA.
Advertise commencement of project	Newspaper advertisements in English, Afrikaans and Sesotho announcing the commencement of the study and inviting Interested and Affected Parties (IAPs) to register on the project database were placed in local newspaper <i>Ubuntu & Botho</i> and free magazine <i>De Boer</i> between October and November 2023 (Appendix D1).
Background Information Document (BID)	In November 2023, SRK distributed a BID (Appendix E) in English, Afrikaans and Sesotho requesting identified IAPs (including neighbouring landowners) to register on the project database (Appendix F) in order to remain informed during the EIA process.

Task	Description of task															
Site notices	Nine A2-sized site notification posters (in English, Afrikaans and Sesotho) were placed at the Renoster cluster project boundary at the following co-ordinates: • 27°32'23.84"S, 27°40'17.21"E • 27°33'46.26"S, 27°39'22.40"E • 27°33'30.95"S, 27°41'19.40"E • 27°41'39.79"S, 27°44'40.65"E • 27°39'35.45"S, 27°38'30.75"E • 27°26'3.99"S, 27°44'44.22"E • 27°28'55.06"S, 27°40'38.56"E • 27°37'41.41"S, 27°52'7.04"E • 27°35'2.93"S, 27°50'43.92"E These notification posters contained a brief summary of the proposed project, outlined the S&EIR process to be followed and provided the contact details of the EAP (Appendix D).															
Focus Group meetings	A number of focus group meetings were held during the Pre-Application phase with landowners and authorities to provide stakeholders with the opportunity to discuss any concerns related to the proposed project. Details of the focus group meetings are summarised in the table below. <table><tr><th>Date</th><th>IAP</th><th>Location</th></tr><tr><td>10 October 2023</td><td>Landowners</td><td>Edenville Sports Club</td></tr><tr><td>11 October 2023</td><td>Free State: Department of Community Safety, Roads and Transport</td><td>Online</td></tr><tr><td>10 July 2024</td><td>Ngwathe LM</td><td>Online</td></tr><tr><td>14 August 2024</td><td>Department of Public Works and Infrastructure (DPWI) and DALRRD.</td><td>Online</td></tr></table> Comments and issues raised have been taken into consideration during the Scoping Phase of the EIA process and will be presented in Appendix G1.	Date	IAP	Location	10 October 2023	Landowners	Edenville Sports Club	11 October 2023	Free State: Department of Community Safety, Roads and Transport	Online	10 July 2024	Ngwathe LM	Online	14 August 2024	Department of Public Works and Infrastructure (DPWI) and DALRRD.	Online
Date	IAP	Location														
10 October 2023	Landowners	Edenville Sports Club														
11 October 2023	Free State: Department of Community Safety, Roads and Transport	Online														
10 July 2024	Ngwathe LM	Online														
14 August 2024	Department of Public Works and Infrastructure (DPWI) and DALRRD.	Online														

Table 5-2: Stakeholder engagement undertaken during the Scoping Phase

Task	Objectives	Dates
Place site notification posters around the Renoster cluster	To notify IAPs of the commencement of the formal EIA process and release of the Scoping Report for public comment.	29 January 2025
Advertise commencement of EIA process and release of Scoping Reports for public comment period		29 January 2025
Public comment period	To provide stakeholders with the opportunity to review and comment on the results of the Scoping Phase.	29 January – 28 February 2025
Public open days	To present the findings of the Scoping Report to stakeholders and provide an opportunity for questions and discussion.	20 February 2025
Compile Issues and Responses Summary and finalise Scoping Report	To record all issues and concerns raised and collate these comments in the final report which provides DFFE with information to decide whether to accept the Scoping Report.	14 March 2025

The key activities undertaken in the stakeholder engagement process during the Scoping Phase are described further below.

5.2.1 Identification of Key Stakeholders

Regulation 42 of the EIA Regulations, 2014, as amended, provides for the opening and maintenance of a Registered Stakeholder (IAP) Database, which must contain personal information (names and contact details). Relevant IAPs from local, provincial and national authorities, conservation bodies, Non-Governmental Organisations (NGO) groups, surrounding IPPs, local businesses and forums and surrounding landowners and occupants were therefore considered for inclusion on the Registered Stakeholder Database for the project and were notified (see Section 8.2) of the opportunity to register on the Registered Stakeholder Database and/or to provide comment on the Scoping and EIA Reports. Relevant authorities were automatically included as registered stakeholders and contact details added to the Registered Stakeholder Database.

As specified in the EIA Regulations, 2014, registered stakeholders and their contact details have been included on the Registered Stakeholder Database to be submitted to the CA. However, to comply with POPIA, the Registered Stakeholder Database was not provided in reports or attached to reports made available in the public domain. However, the Registered Stakeholder Database will need to be provided to appellant(s) if the EA is appealed, and it may also need to be provided to other consultants if, for example, it is a requirement to notify adjacent landowners of temporary noise disturbances associated with project implementation or of the findings of an external audit report. A list of stakeholders initially notified of the process and a list of stakeholders notified for the Scoping Phase are provided in Appendix F. The Registered Stakeholder Database will be updated throughout the process.

In November 2023, SRK distributed a BID in English, Afrikaans and Sesotho (see Appendix E) to identified stakeholders requesting IAPs to register on the database in order to remain informed during the subsequent EIA process.

5.2.2 Focus Group Meetings

A focus group meeting is a small, guided discussion with selected participants to gather opinions, insights and feedback. This helps to guide the assessment of potential impacts during the Impact Assessment Phase (see Section 9.2).

A number of focus group meetings were held during the Pre-Application phase with landowners and authorities to provide stakeholders with the opportunity to discuss any concerns related to the proposed project (see Table 5-1). Key issues raised are broadly summarised in Table 5-3.

Table 5-3: Key issues raised during Pre-Application focus group meetings

IAP	Issues raised
Landowners	None. Landowners should be continually involved throughout the stakeholder engagement process.
Free State: Department of Community Safety, Roads and Transport	Public road safety is paramount. Access routes to the site for large vehicles must take account of bridge infrastructure that has been poorly maintained and will not support large vehicles. Provincial road conditions post-construction must be no worse than they were before commencement of the project.
Ngwathe LM	None. Consent is required for the proposed powerline route that transverses two properties owned by the NLM.

IAP	Issues raised
DPWI and Department of Agriculture, Land Reform and Rural Development	None. Consent is required for the proposed powerline route which transverses one property owned by the DWPI. Both the DPWI and the Department of Water and Sanitation must be consulted.

5.2.3 Notification of the EIA Process and Scoping Report for Public Comment

Newspaper advertisements in English, Afrikaans and Sesotho announcing the commencement of the formal S&EIR process and inviting IAPs to register on the project database were placed in local newspaper *Vrystaat Kroon* on 29 January 2025. Proof of placement of newspaper advertisements *is provided in Appendix D2*.

Eight A2-sized site notification posters (in English, Afrikaans and Sesotho) were placed at the Renoster cluster project boundary. These notification posters contain a brief summary of the proposed project, outline the S&EIR process to be followed and provide the contact details of the EAP. Proof of site notice placement *is provided in Appendix D2*.

An electronic version of the report can also be accessed on SRK's website www.srk.co.za (via the 'Knowledge Centre' and 'Public Documents' links) and on a data free website <https://srk.datafree.co/en/public-documents/renoster-wind-farms-development>.

Hard copies of the full report *were* available for viewing at the following venues:

- Ngwathe Public Library;
- Edenville Police Station;
- Ngwathe Local Municipality (Parys);
- Kroonstad Public Library; and
- SRK's office in Rondebosch.

Stakeholders *were* provided with a 30-day comment period *ending 28 February 2025*.

5.2.4 Public Open Day

SRK hosted a Public Open Day on 20 February 2025, *at Edenville Sports Club (from 09h00 – 11h00) and at NG Church, Ngwathe (from 16h00 – 18h00)*. *At the Open Day*, information regarding the project *was presented*, and members of the EIA and project teams *were* available to discuss the project.

5.3 Stakeholder Comments Received

5.3.1 Comments received during the Pre-Application Phase

Stakeholder comments were received in response to the BID by e-mail and via an online form. Stakeholders who submitted written comments during the Pre-Application comment period are listed in Table 5-4. All written comments received during the Pre-Application comment period are included in Appendix G.

Table 5-4: Stakeholders who submitted written comments during the Pre-Application phase

#	Stakeholder	Affiliation	Submission Format	Comment Received
i.	Jack Armour	Free State Agriculture/Vrystaat Landbou	Online Form	6 November 2023
ii.	John Geeringh	Eskom Holdings SOC Limited (Eskom): Transmission Division	Email	7 November 2023

iii.	Wouter Du Randt	MTN South Africa	Email	9 November 2023
iv.	Princess Ngobeni	Openserve (Pty) Ltd (Openserve)	Email	13 November 2023
v.	Boitumelo Melato	DWS	Email	14 November 2023
vi.	Mr I Roux	Department of Community Safety, Roads and Transport (DCSRT): Free State Province	Email	15 November 2023
vii.	Indra Reddy	Openserve	Email	11 January 2024

Broadly summarised, comments primarily focussed on requests for detailed project information and concerns about the impact on existing infrastructure including roads, communication lines, and utility services.

Comments received, including those solicited at focus group meetings, *are being* addressed through the EIA process.

5.3.2 Comments received during the Scoping Phase

After notifying stakeholders of the formal commencement of the EIA Process and the release of the Scoping Report for public review, 13 stakeholder comments were received. Stakeholders who submitted written comments are listed in Table 5-5. The issues and associated responses are presented in the Issues and Responses Summary provided in Appendix G2 of the Final Scoping Report. Copies of the full comments are provided in Appendix G3.

Table 5-5: Stakeholders who submitted comments during the Scoping Phase

#	Stakeholder	Affiliation	Format	Comment Received
i.	<u>Kyle Govender</u>	<u>Liquid Intelligent Technologies (Pty) Ltd</u>	<u>Email</u>	<u>29 January 2025</u>
ii.	<u>Hannes Maree</u>	<u>Free State Department of Community Safety, Roads and Transport</u>	<u>Email</u>	<u>30 January 2025</u>
iii.	<u>Nrateng Mashiloane</u>	<u>South African Civil Aviation Authority: Aviation Environmental Compliance Department (SACAA)</u>	<u>Email</u>	<u>5 February 2025</u>
iv.	<u>Princess Ngobeni</u>	<u>Openserve</u>	<u>Email</u>	<u>7 February 2025</u>
v.	<u>Ashley Marimuthu</u>	<u>MultiChoice</u>	<u>Email</u>	<u>10 February 2025</u>
vi.	<u>Rowlen Ryan</u>	<u>DALRRD</u>	<u>Email</u>	<u>11 February 2025</u>
vii.	<u>Bradley Gibbons</u>	<u>Endangered Wildlife Trust (EWT)</u>	<u>Email</u>	<u>21 February 2025</u>
viii.	<u>Dirk De Vos</u>	<u>FDDM: Municipal Health Services</u>	<u>Email</u>	<u>24 February 2025</u>
ix.	<u>Aubrey Boshoff</u>	<u>Helios Towers South Africa</u>	<u>Email</u>	<u>24 February 2025</u>
x.	<u>Jay-Jay Mpelane</u>	<u>DFFE Directorate: Integrated Environmental Authorisations</u>	<u>Email</u>	<u>26 February 2025</u>
xi.	<u>Azrah Essop</u>	<u>DFFE Directorate: Integrated Environmental Authorisations</u>	<u>Email</u>	<u>26 February 2025</u>
xii.	<u>Constance Musemburi</u>	<u>DFFE Directorate: Integrated Environmental Authorisations</u>	<u>Email</u>	<u>26 February 2025</u>
xiii.	<u>Mashadu Mudau</u>	<u>DFFE Directorate: Protected Areas and Management Effectiveness</u>	<u>Email</u>	<u>27 February 2025</u>
xiv.	<u>Boitumelo Melato</u>	<u>DWS</u>	<u>Email</u>	<u>27 February 2025</u>
xv.	<u>Mmatlala Rabothata</u>	<u>DFFE Directorate: Biodiversity Conservation</u>	<u>Email</u>	<u>5 March 2025</u>
xvi.	<u>Cassie Carstens</u>	<u>BirdLife South Africa (BLSA)</u>	<u>Email</u>	<u>5 March 2025</u>

The main issues raised by stakeholders on review of the Scoping Report are summarised as follows:

- 1. The project may impact wildlife, specifically by disturbing or displacing terrestrial fauna and avifauna (including SCCs) and through fatalities of avifauna (particularly birds of prey) and bats due to collisions with turbine blades;*

- 3. Construction of the WEF may lead to further degradation of provincial roads in the region;*
- 4. Watercourses may be impacted by the project due to the proximity of proposed infrastructure and the potential abstraction of water for construction and operations; and*
- 5. Proper disposal of waste generated during construction, operations and decommissioning must be ensured.*

5.4 Submission of Final Scoping Report/Next Steps

The Scoping Report was updated where necessary, taking stakeholder input into account. The Final Scoping Report will be submitted to DFFE for acceptance, following which the Impact Assessment Phase will formally commence.

6 Description of the Affected Environment

This chapter presents an overview of the biophysical and socio-economic environment in which the proposed project is located, to:

- Understand the general sensitivity of, and pressures on, the affected environment;
- Inform the identification of potential issues and impacts associated with the proposed project;
- Identify gaps in available information (if any) to inform specialist study requirements in the Impact Assessment Phase; and.
- Conceptualise practical mitigation measures.

The description of the baseline presented in Sections 6.1 and 6.2 is largely based on specialist studies undertaken as part of this S&EIR process, as listed in Table 4-3. Where site-specific information is not available, information is reported at a regional scale, generally for the Ngwathe LM and/or Nketoana LM or FDDM and/or TMDM areas.

In describing the conservation status of plant and animal species throughout this chapter, reference is made to the Red List categories set out by the International Union for Conservation of Nature (IUCN), abbreviated as set out in Figure 6-1.

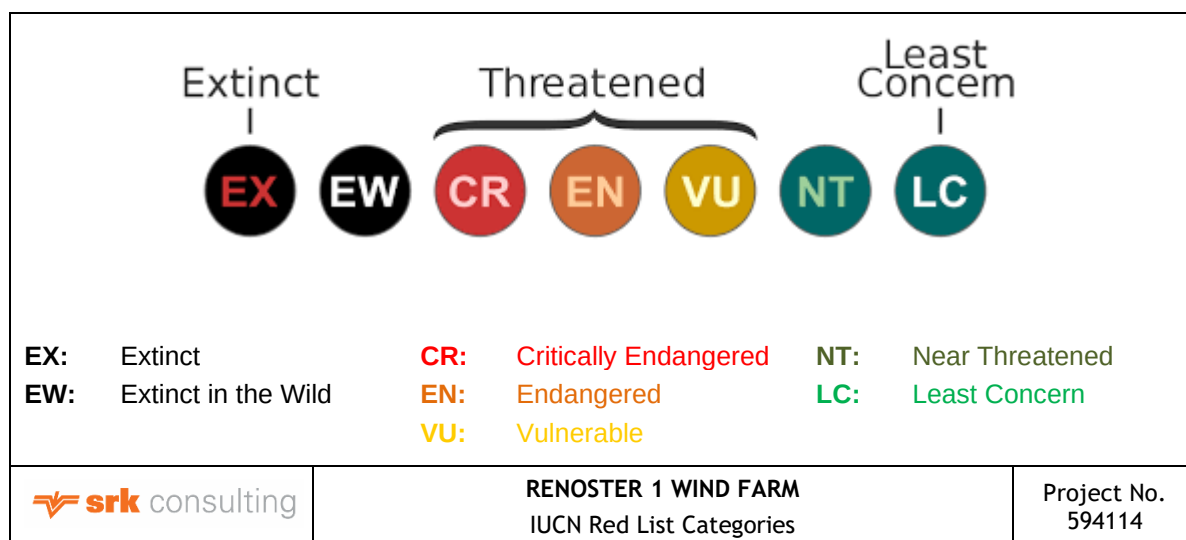


Figure 6-1: IUCN Red List categories

Source: <https://snowleopard.org/statement-iucn-red-list-status-change-snow-leopard/>

6.1 Biophysical Environment

6.1.1 Climate

The climate in the project area, like much of the Free State, is influenced by its inland location and altitude (~ 1 500 m above sea level [masl]). The project area experiences a semi-arid climate, with relatively low annual rainfall, which is typical for the interior regions of South Africa. Summers are warm to hot, with average daytime temperatures ranging from 25°C to 30°C (Figure 6-2).

Occasionally, temperatures can exceed 35°C (Figure 6-2). Winters are mild to cool, with average daytime temperatures ranging from 10°C to 20°C. Nighttime temperatures can drop to around 0°C, and frost is common. The area enjoys a high number of sunshine hours throughout the year, contributing to its dry conditions.

The average annual rainfall is around 500 to 600 mm (Figure 6-2), mostly occurring during the summer months, typically from November to March. Rainfall is often in the form of thunderstorms, which can be intense but short-lived. Humidity levels are generally low, especially during the winter months. The region can experience occasional droughts, which can impact agriculture and water resources.

The region can experience strong winds, particularly during spring and summer (Figure 6-3). During the summer months, the prevailing winds are often from the southeast. These winds can bring moisture from the Indian Ocean, contributing to the summer rainfall. In the winter months, the prevailing winds are typically from the north, contributing to dry conditions (Figure 6-4).

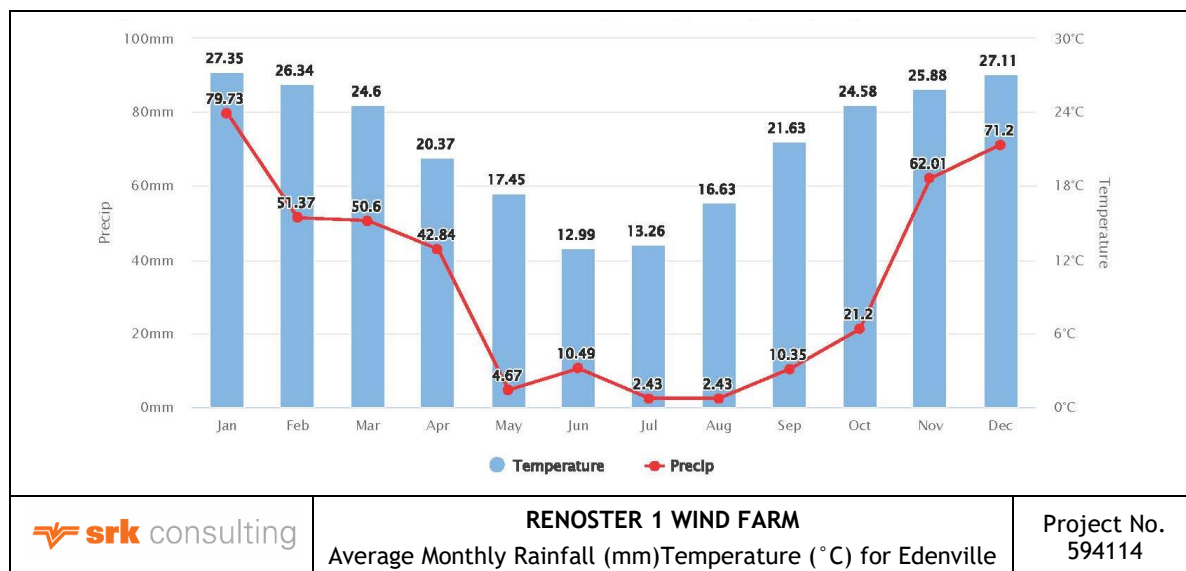


Figure 6-2: Average monthly rainfall (mm) and temperature (°C) for Edenville

Source: (weatherandclimate.com, 2024)

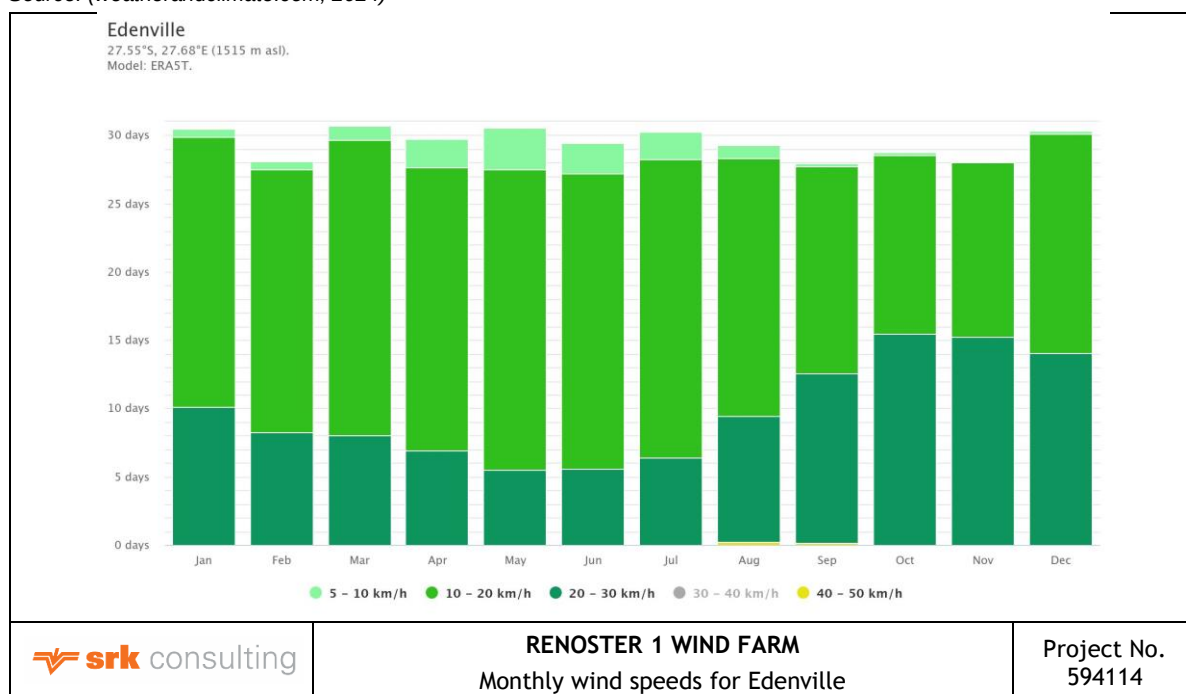


Figure 6-3: Monthly average wind speeds for Edenville

Source: (meteoblue, 2025)

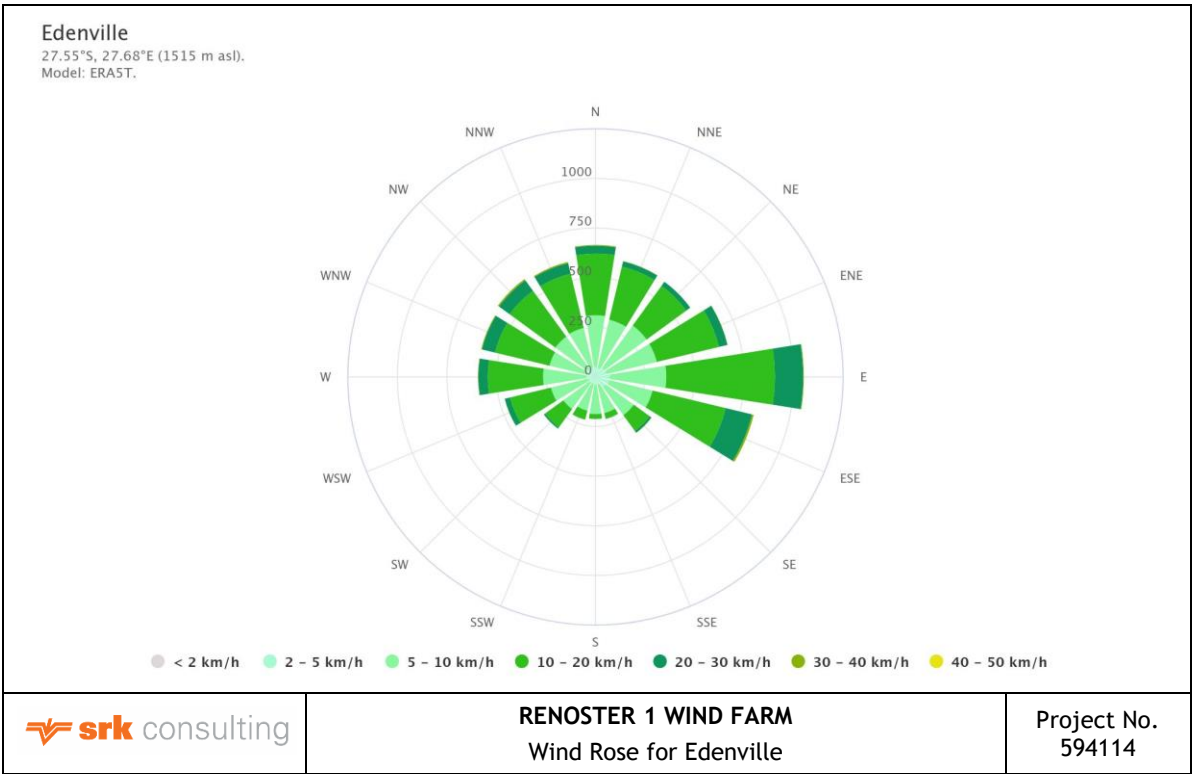


Figure 6-4: Wind rose for Edenville

Source: (meteoblue, 2025)

6.1.2 Topography

The site proposed for the Renoster Wind Farms Development is largely characterised by flat to gently undulating topography (Figure 6-5) with slightly higher elevations to the southeast of the project site. The town of Edenville is located approximately 1 515 masl. Slopes across the project site are relatively gentle to moderate. Figure 6-6 and Figure 6-7 display the topography and slope profile of the project site.

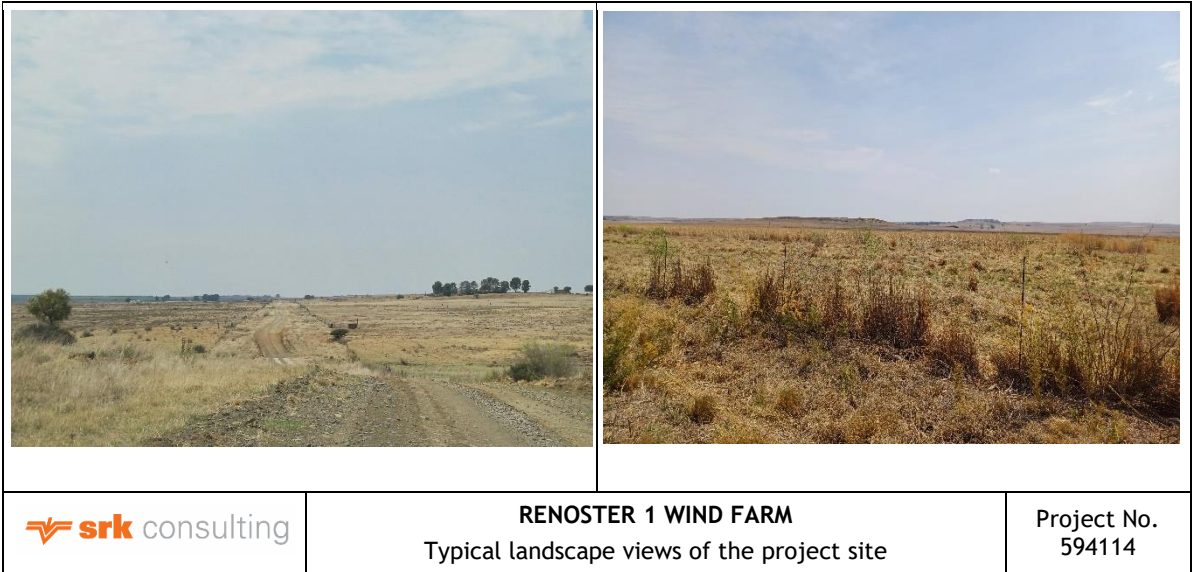


Figure 6-5: Typical landscape views of the project site

6.1.3 Geology

The Karoo Supergroup covers a large proportion of South Africa, extending from east of Pretoria southwest to the Cape Fold Mountains and eastwards almost to the KwaZulu Natal south coast. The northern extent is bounded by the much older Transvaal Supergroup rocks that characterise the Vredefort Dome area. Representing some 120 million years (300 – 183Ma), these rocks were deposited in basins that formed during the formation and breakup of Pangea (Marion Bamford Consulting, 2024).

The project area is directly underlain by the mudstones, siltstones, shale and sandstones of the Normadien Formation, belonging to the Beaufort Group. The Normadien Formation is of late Permian age and is specifically found in the northern portions of the Karoo Basin (Johnson, et al., 2006). These sediments were subsequently intruded during the Jurassic Period by dolerite sills and dykes of the Karoo Dolerite Suite. In some parts of the project area, especially in the western portions, the sediments of the Normadien Formation and the dolerite intrusions are covered by either Quaternary-aged aeolian sands or alluvium. The geology of the project area is depicted in Figure 6-8 and the main geological formations in the area are summarised in Table 6-1.

Table 6-1: Geological formations in the project area

Code	Group	Formation	Lithology
Q-a	Quaternary-aged sediments		Alluvium
Q-s			Aeolian sand
J-d	Jurassic intrusions		Karoo dolerite
Pn	Beaufort	Normadien	Green-grey and (at the top) red mudstone and siltstone, grey shale and rhythmite, sandstone

Source: Council for Geoscience (Geoss, 2024)

6.1.4 Hydrogeology

The regional aquifers directly underlying the entire Renoster Wind Farms project area are classified by the Department of Water Affairs and Forestry (DWAF) (2000) as intergranular and fractured aquifers. In an intergranular and fractured aquifer, groundwater flows in spaces between grains or weathered rock as well as in joints, fissures, cracks and fractures within the rock. Some regions of the cluster area, especially in the western portions, the Normadien Formation and the dolerite intrusions are covered by either Quaternary-aged aeolian sands or alluvium. These sediments are intrinsically porous and constitute the primary intergranular aquifer. The normally low permeability layers of the Normandien Formation have been fractured by tectonic activity, creating secondary aquifers.

The aquifers underlying the project area have an average borehole yield potential of 2 - 5 litres per second (L/s), but this decreases to ≥ 0.50 L/s in the north-east of the project area (Geoss, 2024).

Groundwater in the region is generally of fairly good quality. It is primarily used as drinking water for livestock and, in some cases, for human consumption. However, laboratory analyses of four water samples collected during the specialist's field investigation, along with two sets of historical results, indicate elevated concentrations of certain major cations and anions in some instances. These parameters include electrical conductivity (EC), total dissolved solids (TDS), turbidity, sulphate, nitrite, nitrate, and hardness. Some of the water samples do not meet SANS 241-1 (2015) and DWAF (1998) drinking water standards. With adequate treatment, groundwater is likely to be deemed acceptable for use in domestic applications such as dishwashing and toilet flushing, general construction and concrete batching, and as potable water.

A representative hydrocensus was conducted in May 2024 across the cluster area. A total of 76 data points were visited, including two open artesian boreholes. During the field investigation, data including borehole depth, water level (WL), pH, TDS and EC were measured. The data are summarised in Table 6-2. The project area has pH, EC and TDS values of 7.44, 66.95 mS/m and 326.62 mg/L respectively, indicative of fairly good water quality. The groundwater level is relatively shallow with an average depth of 7.53 meters below ground level (mbgl).

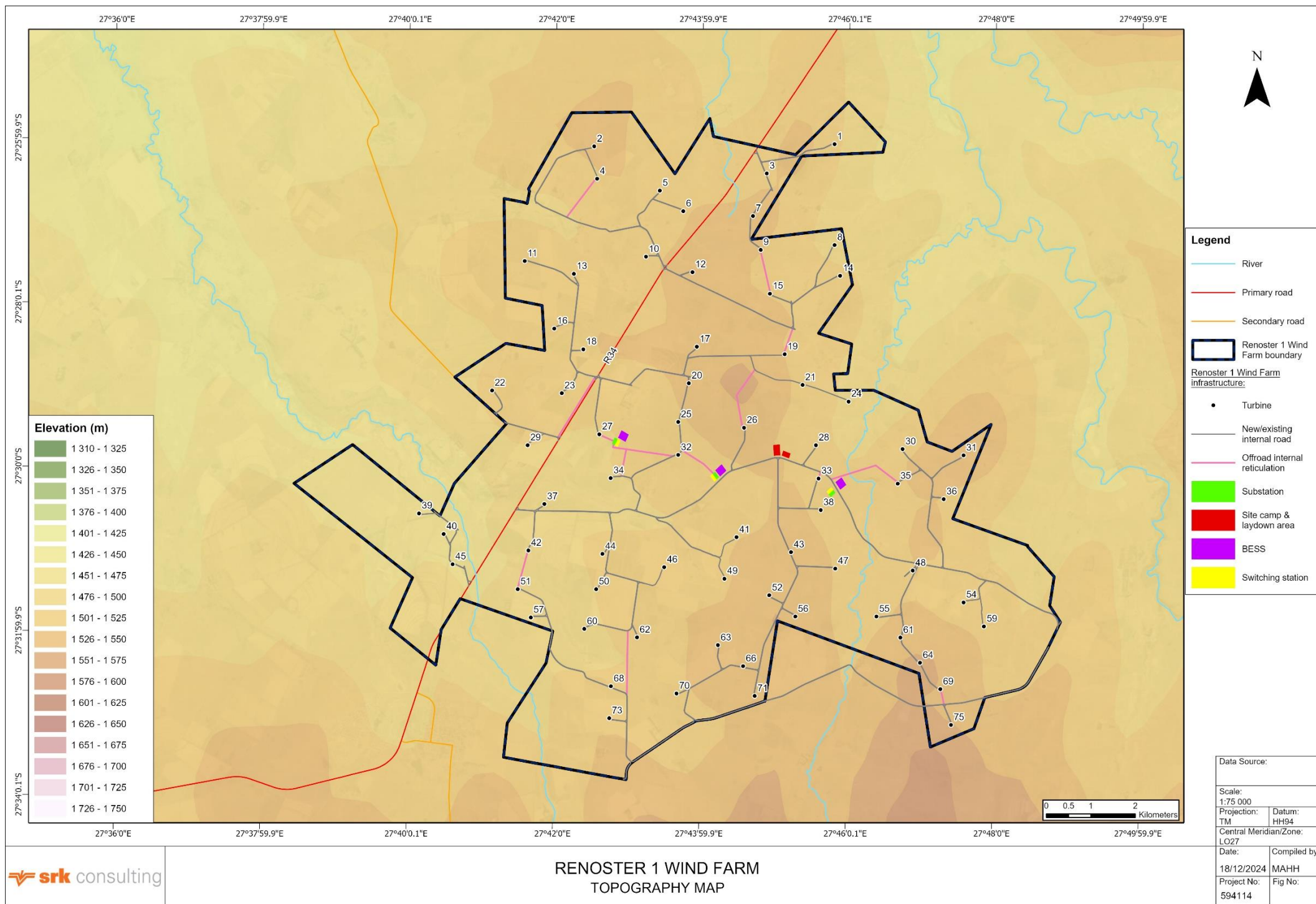
Table 6-2: Statistical summary of the hydrocensus boreholes within the project area of the Renoster WEFs

Regional hydrocensus	pH	EC (mS/m)	TDS (mg/L)	Water Level (mbgl)	Borehole Depth (mbgl)
Maximum	9.20	174.00	870.00	19.40	50.00
Mean	7.44	66.95	326.62	7.53	25.83
Minimum	6.70	42.00	200.00	0.00	16.00
Range	2.50	132.00	670.00	19.40	34.00
Standard Deviation	0.46	27.00	136.75	5.21	12.27
Variance	0.21	729.26	18701.51	27.18	150.57
Number of samples	39	39	39	28	6

Acceptable levels of change in terms of geohydrological conditions are considered to comprise small to negligible changes in water table depth and small changes in chemistry such that current groundwater potability is unchanged.

Groundwater vulnerability can be defined as the 'tendency for contaminants to reach a specified position in the groundwater system after introduction at some location' (Vrba & Zaprozec, 1994). Key physical parameters which determine groundwater vulnerability include lithology, thickness, effective porosity, groundwater flow direction, age and residence time of water. Generally, the residence time of contaminants in groundwater and the distance that it travels in the aquifer are considered important measures of vulnerability.

The underlying fractured aquifer has a Low - Medium groundwater vulnerability. The intergranular aquifer overlying the fractured aquifer has little protection and therefore any contamination that is introduced on the surface of the intergranular aquifer will infiltrate into the subsurface and can cause contamination of this aquifer. Therefore, the vulnerability specifically for the intergranular aquifer is considered to be Medium.



Path: Y:\594114 Renoster Wind Farm GIS\8GIS\GISPROJ\PRO\594114_Renoster_Wind_Farm\594114_Renoster_Wind_Farm.aprx

Figure 6-6: Topography of the Renoster 1 project site

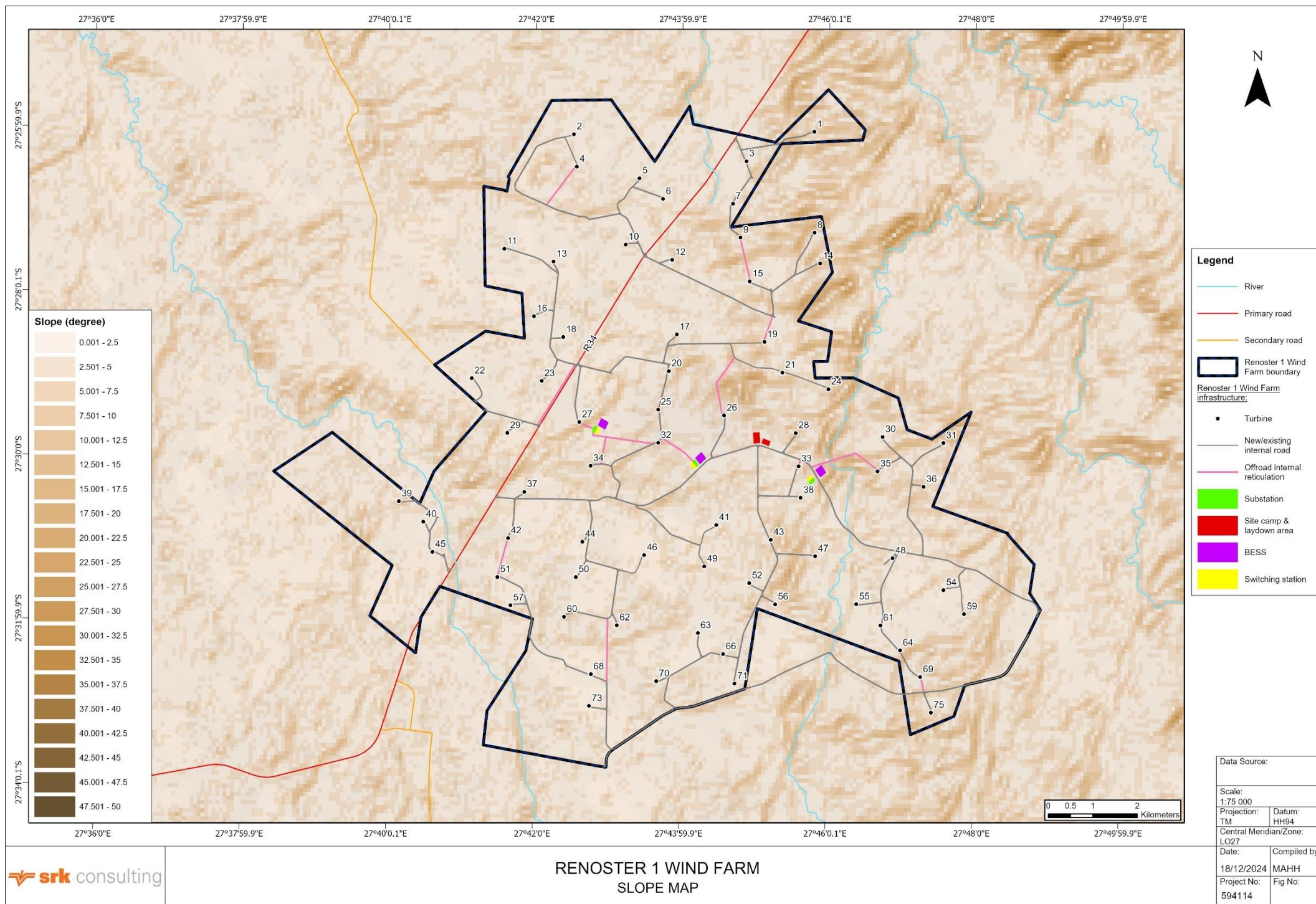


Figure 6-7: Slopes in the Renoster 1 project site

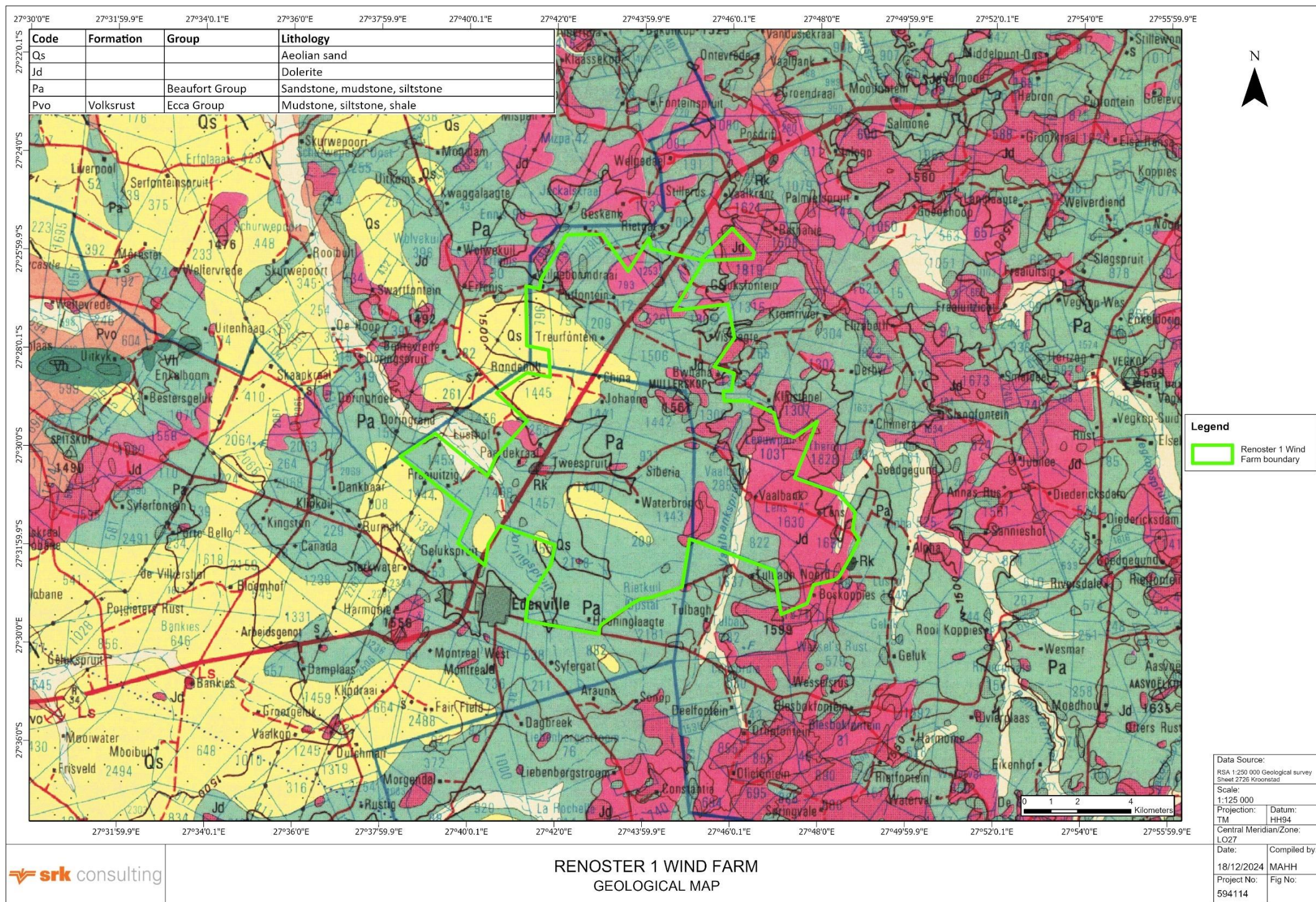


Figure 6-8: Geology of the Renoster 1 project site

6.1.5 Air Quality

The main sources of emission in the project area are as follows:

- Dust entrainment from vehicles travelling on unpaved roads;
- Primary and secondary emissions from motor vehicle exhausts;
- Domestic fuel combustion at Edenville and Ngwathe – burning of coal, paraffin and /or wood for cooking and/or space heating;
- Crop-residue burning (e.g. from agricultural activities) and wildfires (veld fires); and
- Windblown dust (e.g. from cleared agricultural areas).

Vehicle emissions and dust entrainment from vehicles travelling on unpaved roads are not considered to be a significant emission sources at the site because of the very low traffic volumes. Periodic emissions from domestic fuel combustion at Edenville and Ngwathe, crop residue burning, wildfires and windblown dust from cleared agricultural areas are likely to negatively affect air quality. Nevertheless, air quality is considered to be relatively good at the site.

6.1.6 Noise

Rural areas are typically characterised by low population density and minimal industrial or urban development and ambient noise levels are generally lower than in urban or suburban areas. Rural areas are dominated by natural sounds (e.g. wind and fauna) rather than anthropogenic (human-made) noises (e.g. traffic, construction and/or industrial operations).

During the day, the average ambient noise level at the site is ~46 dBA, typical of a rural noise district²⁵. However, wind and fauna in the project area contribute to comparatively elevated ambient night-time noise levels of ~40 dBA, which is atypical of noise levels associated with rural noise districts at night (i.e. ambient noise levels are elevated at the site) (Enviro Acoustic Research cc, 2024).

6.1.7 Agriculture

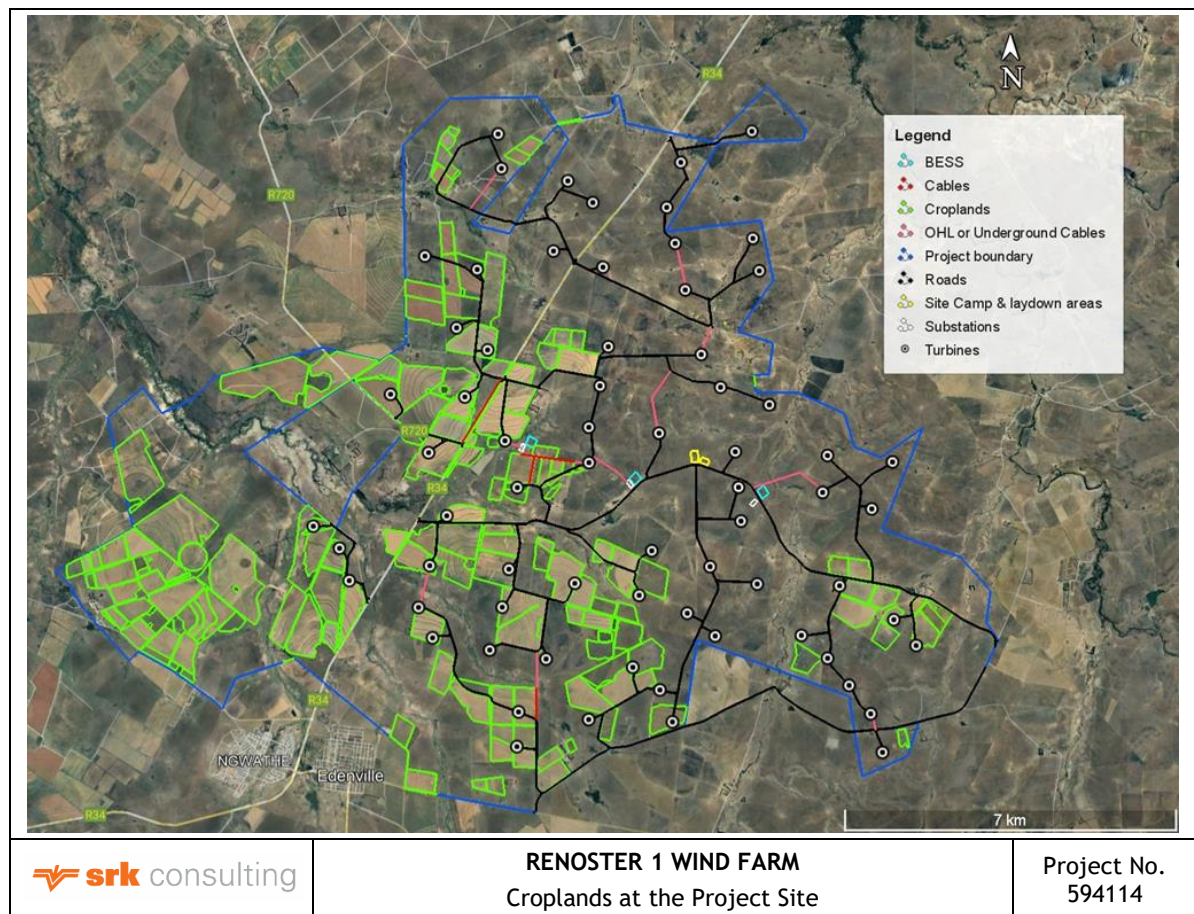
Farming is the predominant economic activity in the district. Cattle and crops, particularly maize, sorghum and sunflowers, are raised.

The cropping potential of much of the Renoster 1 Wind Farm site is constrained by the combination of the fairly low rainfall and soil constraints (see Figure 6-9).

Soils are generally limited in depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. Because of these constraints, much of the site is unsuitable for viable dryland crop production and its viable agricultural use is limited to grazing.

Crop-suitable versus unsuitable soils have generally been identified (by farmers) over time through trial and error. All the deep, well-drained, suitable soils are generally cropped, while uncropped soils that are used for grazing can fairly reliably be considered to have limitations that make them unsuitable for crop production. It should be noted that cropping potential changes with the changing agricultural market forces - poorer soils that may have been viably cropped in the past may be abandoned as cropland as they become too marginal for viable crop production if prices and/or demand falls, and input costs increase.

²⁵ An area where noise levels are considered acceptable for natural settings (~45 dBA during the day and ~35 dBA at night).

**Figure 6-9: Croplands at the project site**

Source: (SoilZA, 2024)

Table 6-3: Parameters determining agricultural production potential of the site

	Parameter	Value
Climate	Köppen-Geiger climate description	Temperate, dry winter, warm summer
	Mean Annual Rainfall (mm)	439 to 593
	Reference Crop Evaporation Annual Total (mm)	1 361 to 1 409
	Climate capability classification (out of 9)	5 (moderate)
Terrain	Terrain type	Highveld plains with low variation in elevation
	Terrain morphological unit	Varied
	Slope gradients (%)	0 to 9
	Altitude (m)	1 570
	Terrain capability classification (out of 9)	3 (low) to 8 (high – very high)
Soil	Geology	Dc11 - Mainly Ecca shale and sandstone with dolerite sills; also Hekpoort lava, Ventersdorp lava and Adelaide Subgroup mudstone and sandstone; and - Occasional pans present. Dc10: - Mainly Adelaide and Tarkastad Subgroups mudstone,

	Parameter	Value
		shale and sandstone; • Burgersdorp Formation mudstone, shale and sandstone in southeast; • Ecca shale, mudstone, sandstone and grit in far north; • Many dolerite sills; and • Crests and scarps on dolerite or sandstone, midslopes and footslopes mainly on mudstone and shale. Bd21: • Adelaide Subgroup and Ecca sandstone, mudstone and shale, with occasional dolerite sills; • Ventersdorp lava may occur sporadically in the north; and • Aeolian and/or colluvial sand overlies nearly all rocks.
	Land type	Dc11, Dc10, Bd21
	Description of the soils	Range of soil conditions including deeper, higher potential soils that are suitable for cropping and depth limited soils that are not.
	Dominant soil forms	Valsrivier, Bonheim, Rensberg, Willowbrook, Swartland, Rock outcrops, Mispah, Avalon and Wesleigh.
	Soil capability classification (out of 9)	3 (low) to 6 (moderate – high)
	Soil limitations	Limited soil depth and drainage
Land	Agricultural land use in the surrounding area	Rainfed cropping, Natural grazing
	Agricultural land use on the site	Rainfed cropping, Natural grazing
General	Long-term grazing capacity (ha/LSU)	5 to 6
	Land capability classification (out of 15)	4 (low – very low) to 9 (moderate – high)
	Within proposed Protected Agricultural Area	Partially
	Within REDZ	No

Source: (SoilZA, 2024)

A section in the southwestern portion of the Renoster 1 Wind Farm site is located within a proposed Protected Agricultural Area (PAA). PAAs are demarcated areas in which the climate, terrain, and soil are generally conducive for agricultural production and which, historically, have made important contributions to the production of crops cultivated across South Africa. The protection of viable arable land is a priority for PAAs (SoilZA, 2024).

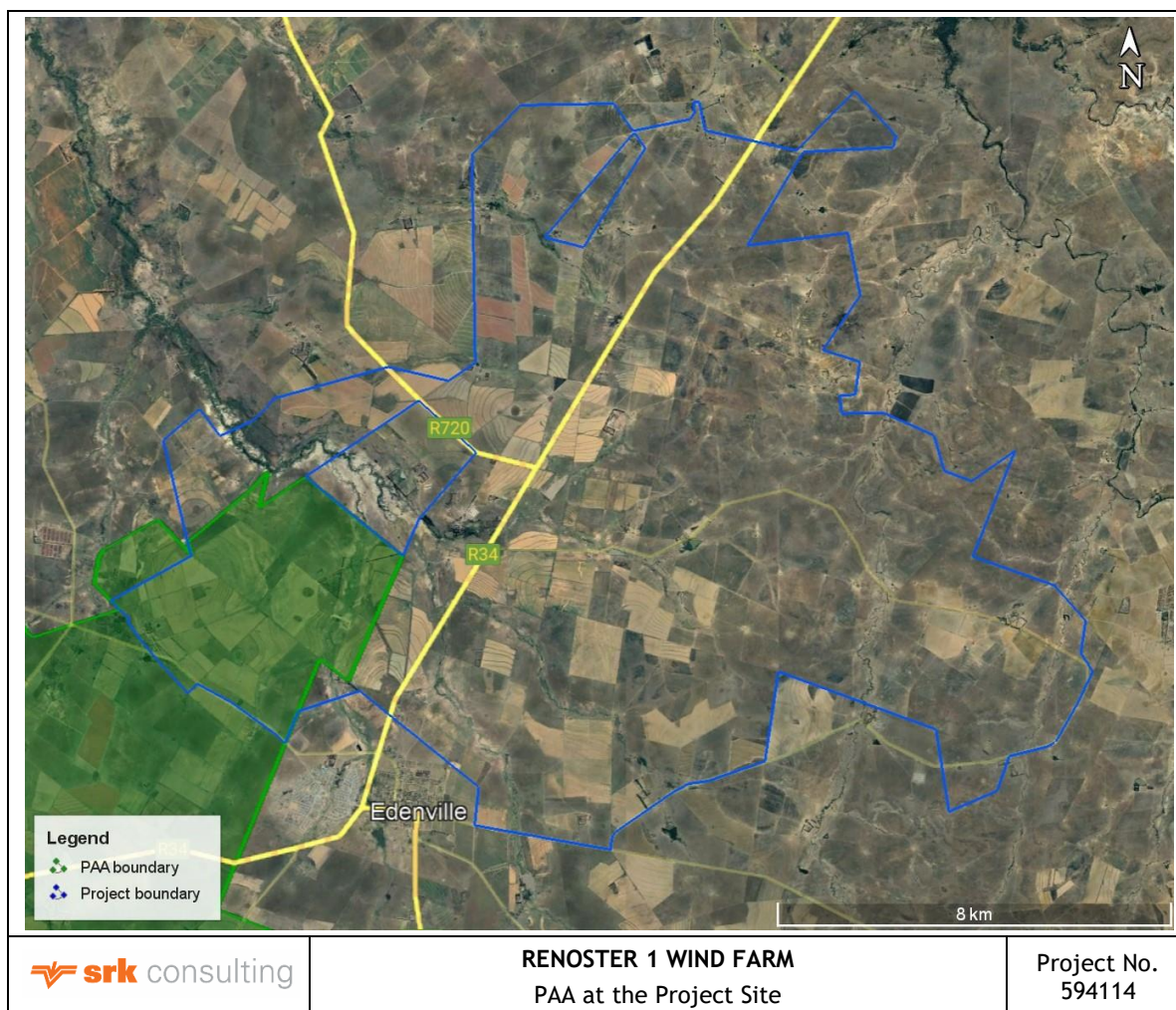


Figure 6-10: Proposed PAA at the project site

Source: (SoilZA, 2024)

6.1.8 Aquatic Ecosystems

6.1.8.1 Regional Context

The project area lies in the Highveld Ecoregion. This high-lying ecoregion is characterised by plains with a moderate to low relief, as well as various grassland vegetation types (Day, 2024). Wetlands in this ecoregion have been classified in the National Biodiversity Assessment (NBA) as part of the Dry Highveld Grassland Bioregion and are considered to be *Critically Endangered* (Van Deventer et al, 2018).

6.1.8.2 Catchment Context

The Renoster cluster lies within the Renoster/Vals sub-Water Management Area (WMA), which is part of the Middle Vaal WMA and straddles quaternary catchments C70A, C60C, C70D and C70B (Figure 6-11). The site itself is drained by tributaries of the Vals River, the Vaalbankspruit River, a tributary of the Renoster River, and the Doringspruit River (Figure 6-11). The Renoster River, Doringspruit River and Vals River enter the Vaal River to the west of the cluster, in the Middle Vaal sub-WMA.

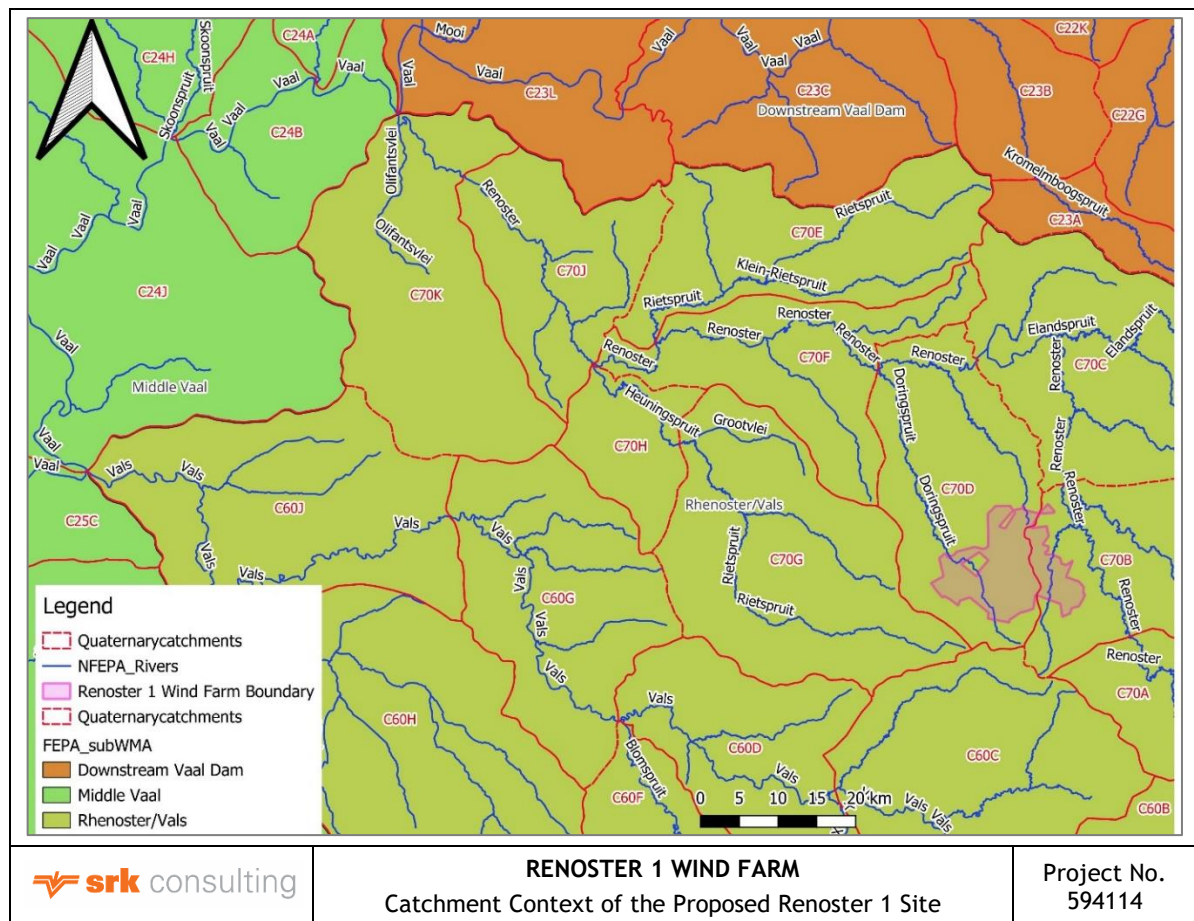


Figure 6-11: Catchment context of the proposed Renoster 1 site

Source: (Day, 2024)

Figure 6-12 indicates the Renoster 1 project site in the context of river Freshwater Ecosystem Priority Areas²⁶ (FEPAs). A north-south band along the eastern boundary of the project site within the Vaalbankspruit sub-catchment has been ranked as a river FEPA. This FEPA includes the Renoster River itself, which lies outside of the project site. The FEPA lies upstream of a Fish Support Area (FSA) along the lower reaches of the Renoster River, and upstream of a Phase 2 FEPA²⁷ sub-catchment, also along the Renoster River.

There are no threatened or near-threatened fish species within any of the above sub-catchments, and as such it is assumed that the FEPA status of these sub-catchments relates to their overall river condition, i.e. a Present Ecological State (PES) A or B (Day, 2024). The section of the Renoster River downstream of the project site that has been mapped as an FSA has been rated as having a PES of Category C/D and therefore might not be in a condition to support important fish communities (Day, 2024).

²⁶ The National Freshwater Ecosystem priority Areas (NFEPA) project provides strategic spatial priorities to meet South Africa's freshwater ecosystem conservation goals and sustainable use of water resources (<https://www.sanbi.org/documents/national-freshwater-ecosystem-priority-areas-nfepa-project-update-may-2011/>).

²⁷ Phase 2 FEPAs are identified in moderately modified rivers (C ecological category), in cases where it is not possible to meet biodiversity targets in rivers that were still in good condition (A or B ecological category). River condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed.

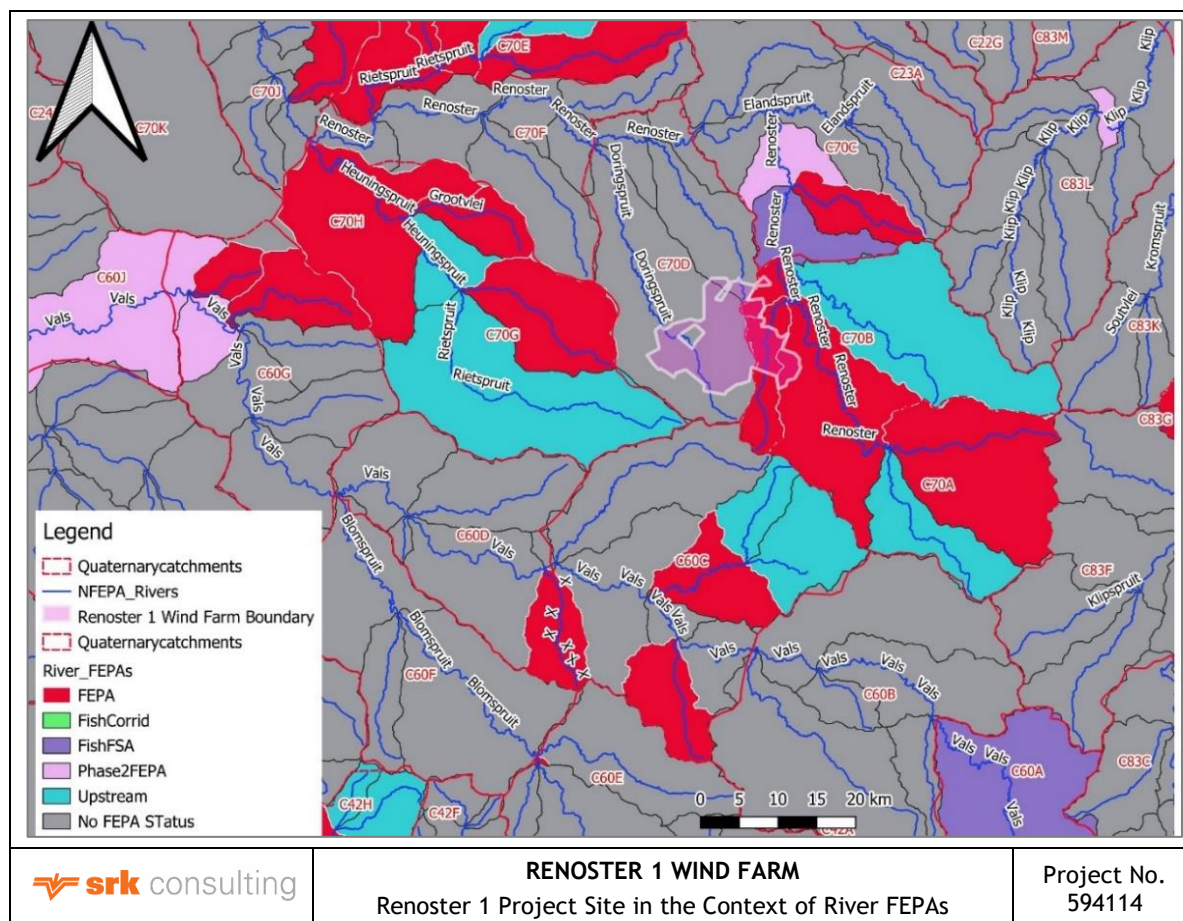


Figure 6-12: Renoster 1 project site in the context of river FEPAs

Source: (Day, 2024)

6.1.8.3 Aquatic Ecosystems at the Site

The landscape is characterised by a network of poorly defined, seasonal hillslope seeps that feed into valley bottom wetlands. These in turn lead to wetland-dominated lowland rivers and their associated floodplains. These floodplains include seasonally inundated wetland depressions within grassy, seasonally saturated to inundated floodplain wetland flats that provide important habitat for fauna, including birds and other water-associated fauna.

In some areas, rocky outcrops give rise to seasonally inundated pools or pans, and feed into rocky foothills that lead to downstream watercourses such as valley bottom wetlands and lowland rivers.

6.1.8.4 Water Quality

Water quality samples from the site and surrounding areas indicate that river water quality has been impaired (Day, 2024). It is assumed that this is as a result of agricultural activities in the area.

A SASS5 aquatic macroinvertebrate bioassessment undertaken at the site indicates that aquatic biodiversity is relatively low and in-stream habitat quality is relatively poor, corroborating (poor) water quality data from the area.

6.1.8.5 Watercourse Condition

Watercourse condition at the project site was rated in broad-based PES categories (A/B; C/D; E/F). Erosion, proximity to development (roads, buildings, feedlots) and alien vegetation are the main stressors affecting watercourse condition in the area (Day, 2024) (Figure 6-13).

The following observations were made about overall watercourse condition at the project site (Day, 2024):

- Channel incision and erosion, mainly resulting from poorly designed watercourse crossings/bridges, is widespread throughout the project site;
- Large-scale abstraction from dams for stock watering and irrigation is evident;
- Alien vegetation further contributes to the impaired condition of watercourses at the project site; and
- The least-impacted watercourses tend to be broad seeps in the higher lying parts of the project site.

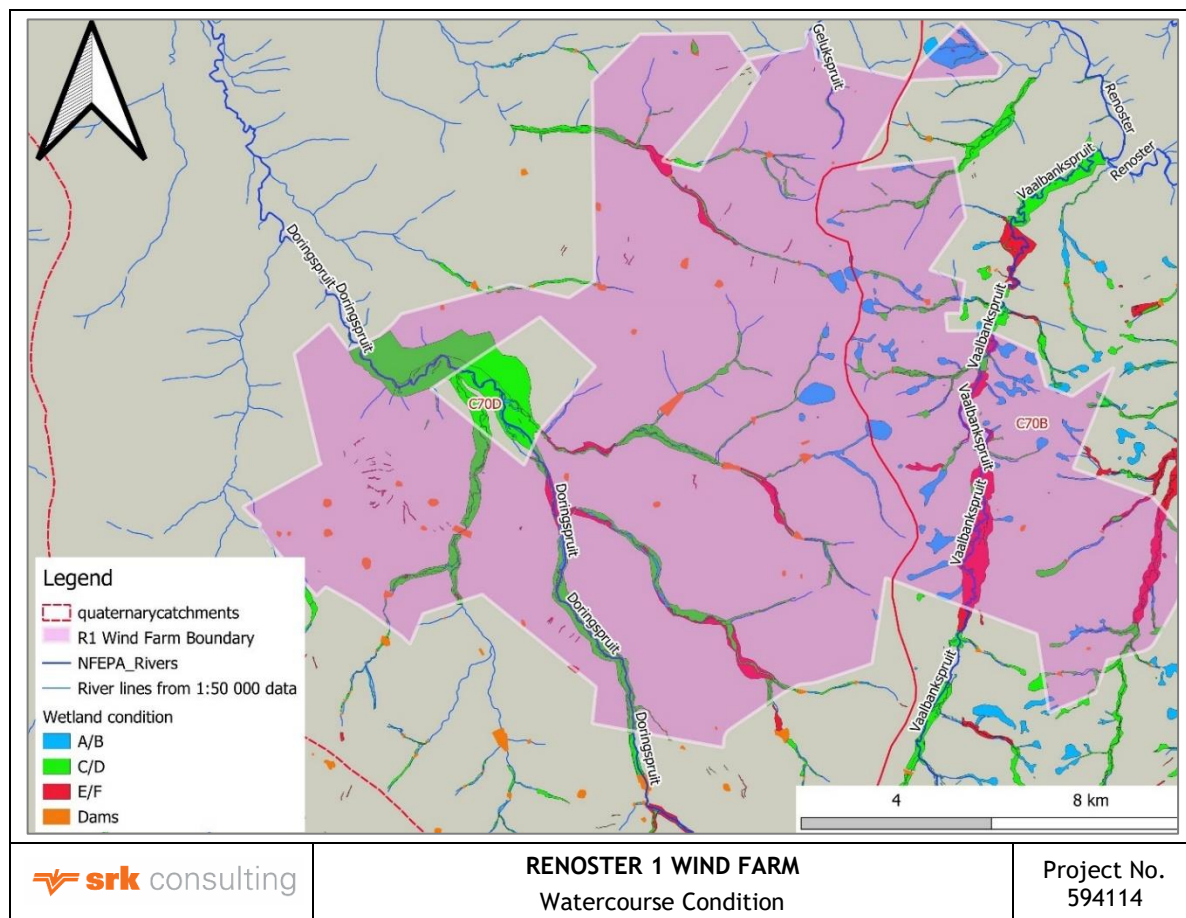


Figure 6-13: Watercourse condition

Source: (Day, 2024)

6.1.9 Terrestrial Biodiversity

6.1.9.1 Regional Context

The project area falls in the Dry Highland Grassland Bioregion within the Grassland Biome, which occurs across the high central plateau and the inland areas of KwaZulu-Natal and the Eastern Cape of South Africa. In the biome, the topography is mainly flat and rolling but includes the escarpment and varies in altitude from near sea level to 2 850 masl (Low & Rebelo, 1996), although altitude in the project area is around 1515 masl.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing (overgrazing tends to increase the proportion of pioneer, creeping and annual grasses). Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass

dominance and prevent the establishment of trees, which are notably absent, except in a few localised habitats (Low & Rebelo, 1996).

The Grassland Biome is the cornerstone of South Africa's maize crop, and many grassland types have been converted for its cultivation. Urbanisation is also a major driver of the loss of natural grassland areas - the Witwatersrand is centred in this biome. Nationally, the Grassland Biome is considered to have extremely high biodiversity, second only to the Fynbos Biome. Rare plants are often found in the grasslands, especially in the escarpment area. These rare species are often *Endangered*, comprising mainly endemic geophytes or dicotyledonous herbaceous plants. Very few grasses are *Rare* or *Endangered* (Low & Rebelo, 1996).

6.1.9.2 Vegetation Types of the Project Area

At least half of the Renoster 1 Wind Farm site has been transformed for agriculture. The remaining intact areas are broadly homogenous, consisting of open grasslands on plains and gentle hills, as well as extensive drainage systems. In the broader area, the primary drivers of vegetation composition and structure are soil depth/rockiness and moisture availability. The site supports two vegetation types: Central Free State Grassland which covers most of the site, while a limited amount of Vaal-Vet Sandy Grassland is present in the west of the site (Figure 6-14) (Todd, 2024).

6.1.9.2.1 Central Free State Grassland

Central Free State Grassland occurs in the Free State and marginally into Gauteng, in a broad zone from around Sasolburg in the north to Dewetsdorp in the south. It typically occurs on undulating plains, supporting short grassland that, in natural condition, is dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf Karoo bushes establish in severely degraded clayey bottomlands, while overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Vachelia karroo* encroachment. Although Central Free State Grassland is classified as *Least Concern* (SANBI, 2019), approximately 25% has been lost to agriculture and dams and very little is currently formally conserved (Todd, 2024).

6.1.9.2.2 Vaal-Vet Sandy Grassland

This vegetation type is classified as *Endangered* under the 2018 National Biodiversity Assessment and approximately 65% of its original extent has been lost (SANBI, 2019). Vaal-Vet Sandy Grassland occurs in the North-West Province and Free State, from south of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein. It occurs on plains-dominated landscapes as well as on some scattered, slightly irregular undulating plains and hills, and comprises mainly low-tussock grasslands with an abundant karroid element. Dominance of *T. triandra* is an important feature of this vegetation unit. Locally, low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* are attributed to heavy grazing and/or erratic rainfall.

The majority of Vaal-Vet Sandy Grassland within the Renoster 1 Wind Farm site has been transformed for agriculture (Todd, 2024).

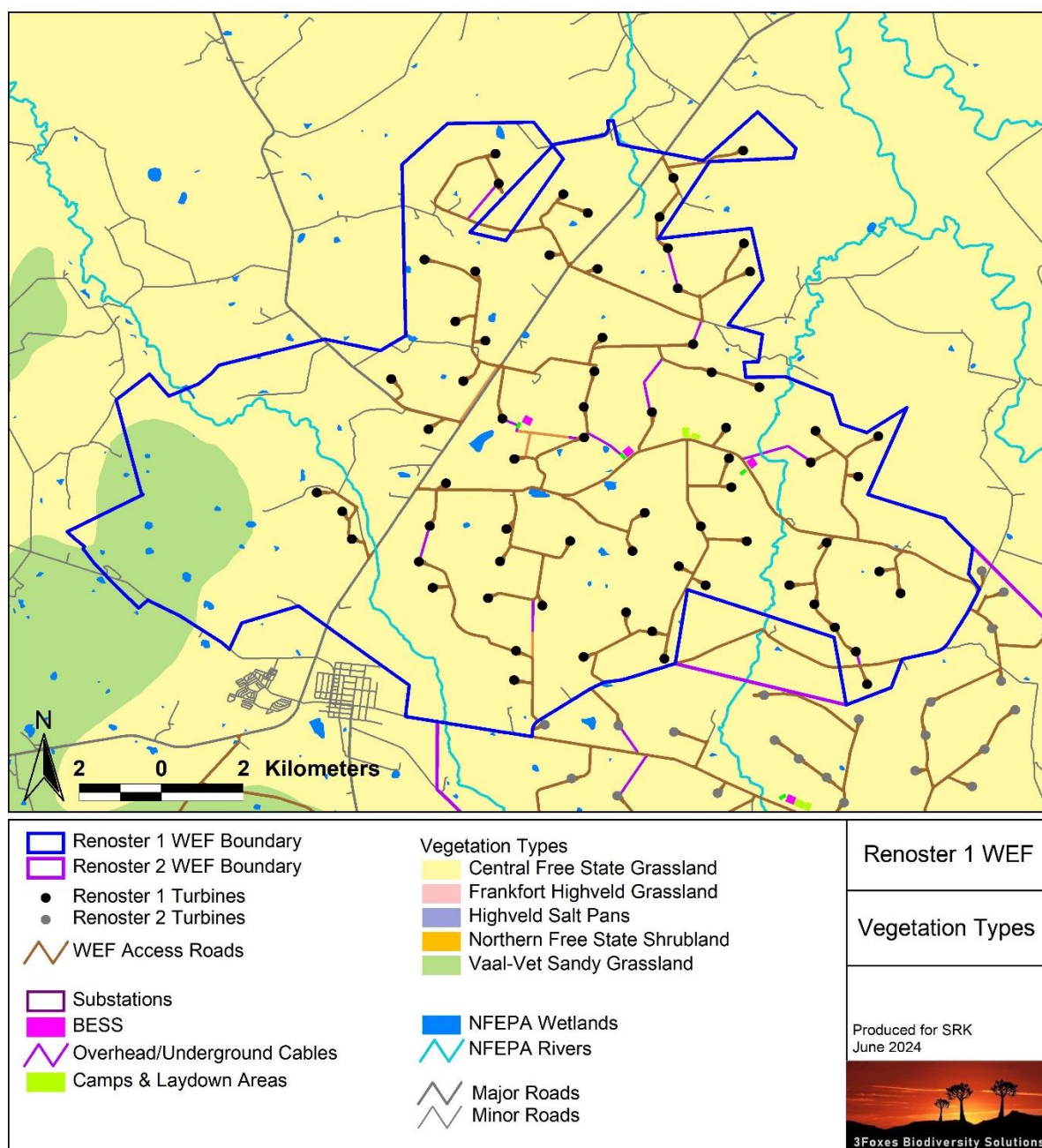


Figure 6-14: Vegetation types of the Renoster 1 Wind Farm site

Source: (Todd, 2024)

6.1.9.3 Plant Species

No plant species of conservation concern (SCC) are known from the area and none were identified during the extensive site surveys. Plant species present on the site are widespread and typical of the broader area (Todd, 2024).



Figure 6-15: A large proportion of the Renoster 1 Wind Farm consists of croplands, used for dryland cereal production or fodder crops

Source: (Todd, 2024)



Figure 6-16: Typical open grassland, representative of the Central Free State Grassland vegetation type

Source: (Todd, 2024)

6.1.9.4 Animal Species

A number of faunal SCC are known from the broader area, including Sensitive Species 15²⁸ (VU), *Atelerix frontalis* South African hedgehog (VU), *Pelea capreolus* Vaal rhebok (NT), *Redunca fulvorufula* Mountain reedbuck (VU), *Leptailurus serval* Serval (NT), *Ourebia ourebi* subsp. *ourebi* Oribi (EN), *Hydrictis maculicollis* Spotted-necked otter (NT) and *Aonyx capensis* African clawless otter (NT). Based on the observations from the site as well as the analysis of distribution records for these species, their habitat requirements and the nature and extent of different habitats on site, Sensitive Species 15, African clawless otter and Serval are confirmed present, while the remaining species are considered unlikely to be present. No mid- to large-sized fauna SCC were found to occur in the project area.



Figure 6-17: African clawless otter and Serval pictured from the project area

Source: (Todd, 2024)

6.1.9.5 Habitat types

Although the project area is dominated by croplands and grassland, other important faunal habitats are also present.

In terms of broad-scale habitats and features, the extensive drainage features across the site represent important habitat for numerous fauna species as well as being corridors for movement around the landscape. The largest river within the Renoster 1 Wind Farm site is the Vaalbankspruit River which has perennial pools but does not appear to maintain flow through winter. Many other seasonal wetlands and drainage lines traverse the site and all wetland areas have been mapped as *Very High* sensitivity for terrestrial ecology (Figure 6-18). The DFFE Screening Tool listed the Spotted-necked otter as potentially occurring on the site. However, this otter is associated with permanent, flowing water, so it is unlikely that it does occur on site and was not observed during surveys.

Rocky outcrops and ridges are also considered to be important for fauna in context of the site due to the paucity of such habitat within the landscape and the cover that such areas provide for reptiles and small mammals. These localised outcrops and are considered to be of *High* to *Very High* sensitivity (Todd, 2024) (Figure 6-19).

²⁸ This *Vulnerable* reptile species cannot be named in the public domain as per the instructions in the Animal Species Protocol (as amended) published in GN 1150 on 30 October 2020, in terms of the EIA Regulations 2014, as amended.



Figure 6-18: A section of the Vaalbankspruit river, typical of drainage features within the Renoster 1 Wind Farm site

Source: (Todd, 2024).

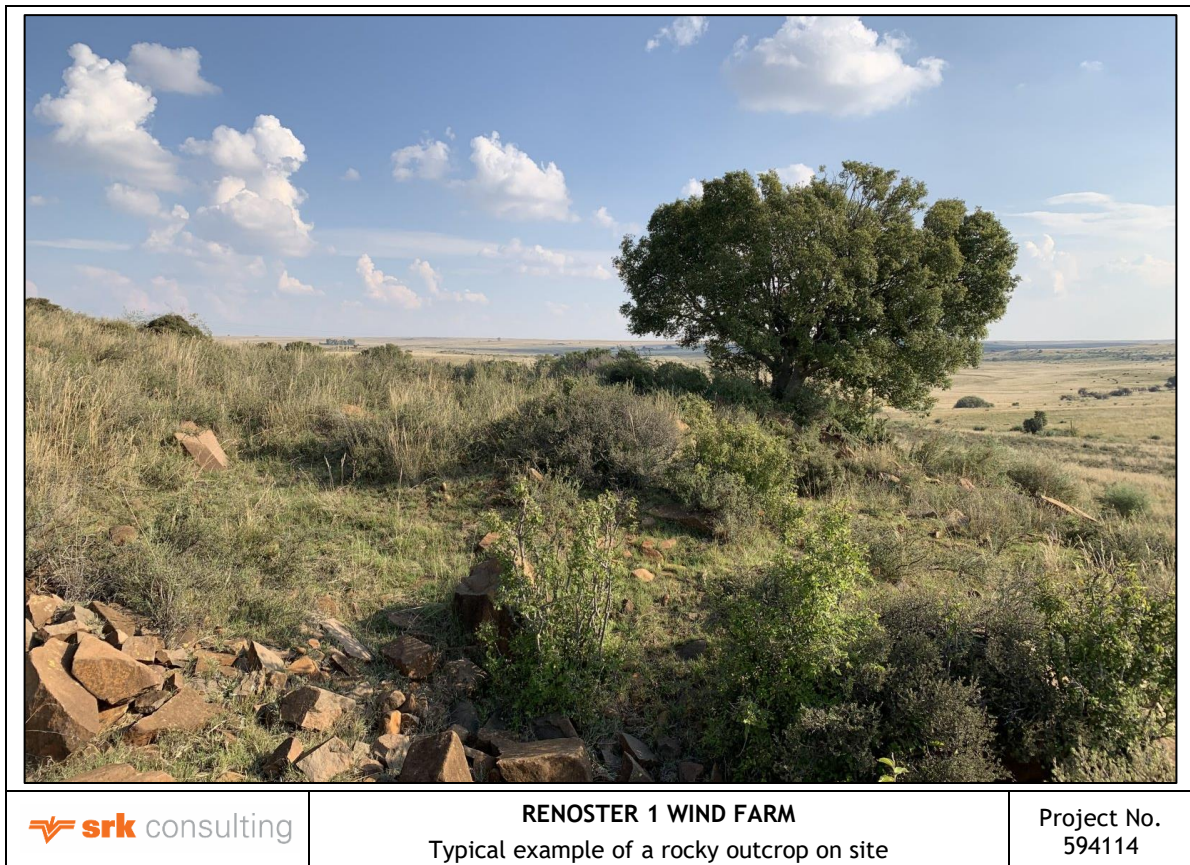


Figure 6-19: A rocky outcrop on the Renoster 1 Wind Farm site

Source: (Todd, 2024).

Sensitive Species 15 is associated with areas of intact, short *T. triandra* grassland, and the distribution of this habitat is disjunct and sporadic across the site, with the result that the distribution of Sensitive Species 15 is similarly fragmented.

Overall, the Renoster 1 Wind Farm site can be considered typical for the wider area and there are no exceptional or rare ecological features present within the site that are not also represented more broadly in the landscape.

6.1.9.6 Biodiversity Conservation Planning

Several biodiversity conservation planning areas overlap with the Renoster 1 Wind Farm project site. These comprise CBAs, ESAs and NPAES Focus Areas, illustrated in Figure 6-20 below. The figure also illustrates the extent of remaining intact Vaal-Vet Sandy Grassland, both according to the 2018 National Biodiversity Assessment as well as the actual remaining extent as mapped during this study. It is noted that CBA areas correspond to the previously mapped extent of Vaal-Vet Sandy Grassland, but parts of these CBAs no longer support this *Endangered* vegetation type. There is considerable overlap with a large expanse of ESA 1 and ESA 2 areas as well as NPAES Focus Areas in the eastern half of the site.

6.1.9.7 Avifauna

6.1.9.7.1 Introduction

Based on an analysis of distribution data, including the Southern African Bird Atlas Project (SABAP2), a total of 222 bird species could potentially occur within the broader area in which the project is located. The Renoster 1 Wind Farm project site is not close to any Important Bird Areas (IBAs).

Grassland habitat predominates over most of the unfarmed portions of the project site. Surface water is very important habitat for avifauna, especially waterbirds and waders. There are several pans, dams, and drainage lines throughout the project site which also attract raptors that prey on other bird species.

While the distribution and abundance of the bird species in and near the project site is mostly associated with natural vegetation, some anthropogenic modifications to the environment create habitat for birds. These include high voltage power lines and alien trees (in an environment otherwise devoid of tall trees) that can provide roosting and nesting habitat for priority species, especially raptors (Figure 6-21), and cultivated areas that provide foraging areas.

6.1.9.7.2 Priority Species and Avifaunal SCC

Of the total bird species potentially occurring on site, 32 species are classified as 'priority species'²⁹ for wind energy developments (see Table 6-4). All 32 of these species were observed on site during site surveys and 31 of them are considered likely to occur regularly on or near the project site. A total of 16 of these are South African Red Listed species (i.e. faunal SCC) (Froneman & Loftie-Eaton, 2024).

No vultures were observed during the monitoring surveys and according to the SABAP2 data, no vultures have been recorded in the broader area. A summary of some priority avifaunal species occurring on the site is provided below.

²⁹ Priority species for wind development were identified from the updated list of priority species for wind farms compiled for the Avian Wind Farm Sensitivity Map (Ralston-Paton *et al.*, 2017; Retief *et al.*, 2012). Additional species of conservation concern recorded on site were also considered as priority species.

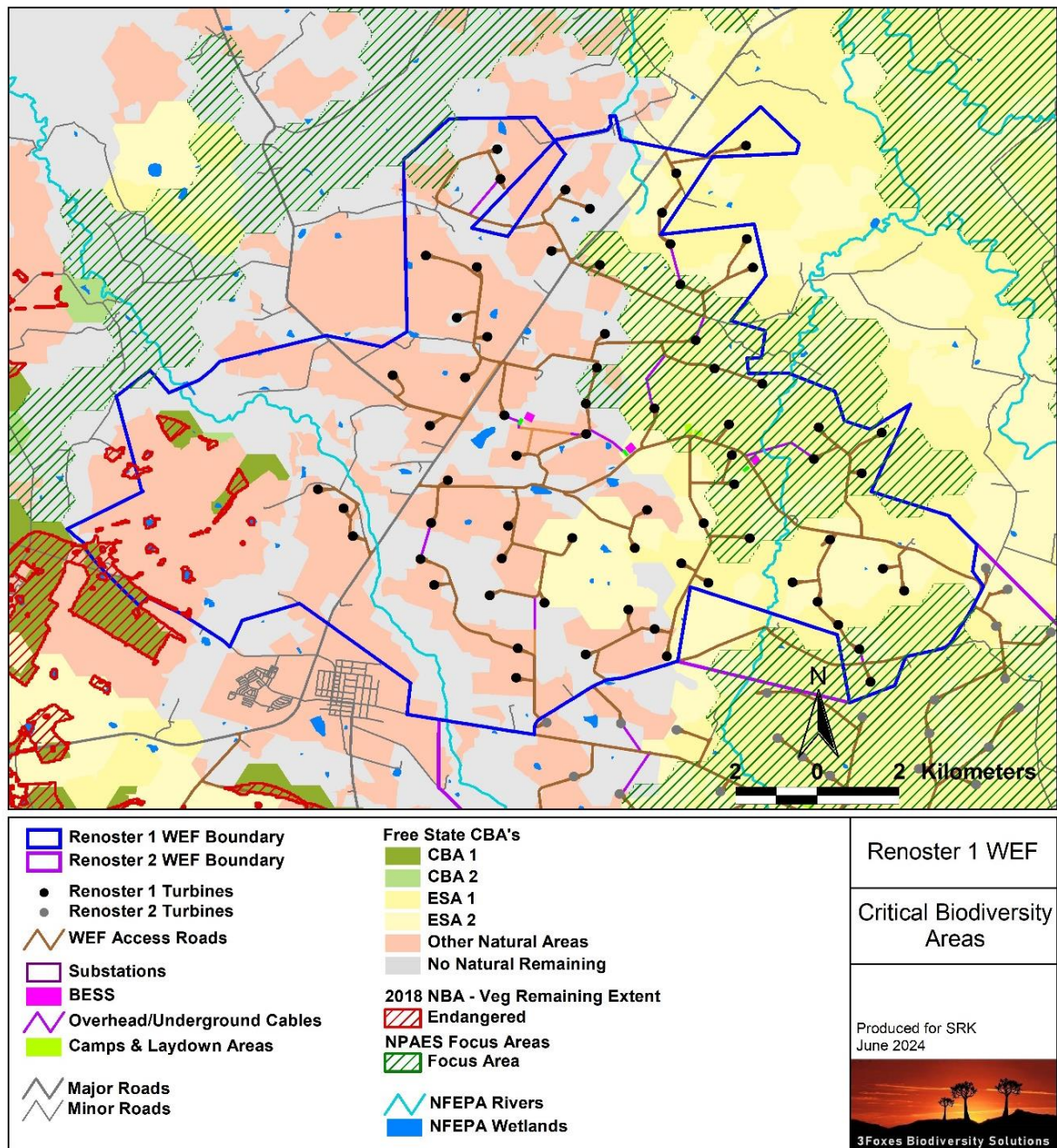


Figure 6-20: Biodiversity conservation areas and intact areas of Vaal-Vet Sandy Grassland present in the Renoster 1 Wind Farm site

Source: (Todd, 2024)



Figure 6-21: A Black sparrowhawk nest in alien *Eucalyptus* trees at the project site

Source: (Froneman & Loftie-Eaton, 2024)

Table 6-4: Priority bird species observed at the Renoster 1 project site

Species name		Conservation Status		Habitat Preference*				
Scientific name	Common name	Regional	Global	G	W	T	P	A
<i>Circus maurus</i>	Black harrier	EN	EN	x				x
<i>Mycteria ibis</i>	Yellow-billed stork	EN	-	x	x			x
<i>Neotis ludwigii</i>	Ludwig's bustard	EN	EN	x				x
<i>Polemaetus bellicosus</i>	Martial eagle	EN	EN	x		x	x	x
<i>Ciconia nigra</i>	Black stork	VU	-	x	x			x
<i>Falco biarmicus</i>	Lanner falcon	VU	-	x			x	x
<i>Geronticus calvus</i>	Southern bald ibis	VU	VU	x	x			x
<i>Neotis denhami</i>	Denham's bustard	VU	NT	x				x
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN	x				x
<i>Tyto capensis</i>	African grass owl	VU	-	x	x			
<i>Circus macrourus</i>	Pallid harrier	NT	NT	x				x

Species name		Conservation Status		Habitat Preference*				
Scientific name	Common name	Regional	Global	G	W	T	P	A
<i>Glareola nordmanni</i>	Black-winged pratincole	NT	NT	x				x
<i>Grus paradisea</i>	Blue crane	NT	VU	x	x			x
<i>Oxyura maccoa</i>	Maccoa duck	NT	EN		x			
<i>Phoeniconaias minor</i>	Lesser flamingo	NT	NT		x			
<i>Phoenicopterus roseus</i>	Greater flamingo	NT	-		x			
<i>Accipiter melanoleucus</i>	Black sparrowhawk	-	-		x	x		
<i>Afrotis afraoides</i>	Northern black korhaan	-	-	x				x
<i>Asio capensis</i>	Marsh owl	-	-	x	x			
<i>Bubo africanus</i>	Spotted eagle-owl	-	-	x		x		
<i>Buteo buteo</i>	Common buzzard	-	-	x		x		x
<i>Buteo rufofuscus</i>	Jackal buzzard	-	-	x		x	x	x
<i>Elanus caeruleus</i>	Black-winged kite	-	-	x		x		x
<i>Eupodotis caerulescens</i>	Blue korhaan	LC	NT	x				x
<i>Falco amurensis</i>	Amur falcon	-	-	x			x	x
<i>Falco naumanni</i>	Lesser kestrel	-	-	x			x	x
<i>Falco rupicoloides</i>	Greater kestrel	-	-	x				x
<i>Haliaeetus vocifer</i>	African fish eagle	-	-		x	x		
<i>Melierax canorus</i>	Pale chanting goshawk	-	-	x		x		x
<i>Mirafra cheniana</i>	Melodious lark	-	-	x				
<i>Polyboroides typus</i>	African harrier-hawk	-	-		x	x		
<i>Rhinoptilus africanus</i>	Double-banded courser	-	-	x				x
<i>Scleroptila afra</i>	Grey-winged francolin	-	-	x				x

*G: Grassland; W: Wetlands, drainage lines and dams; T: Alien trees; P: High voltage powerlines; A: Agricultural areas

Source: (Froneman & Loftie-Eaton, 2024)

***Tyto capensis* African grass owl (VU)**

The regional population of the secretive, nocturnal African Grass Owl is in decline. The species is mainly found in areas of higher rainfall in the eastern half of South Africa and has specific habitat requirements, typically roosting and breeding in tall, dense grass or sedges near wetlands.

***Falco amurensis* Amur falcon (LC) and *Falco naumanni* Lesser kestrel (NT)**

This grassland foraging guild consists of small, gregarious raptors that share similar habitat requirements. *Falco vespertinus* Red-footed falcon (VU), while relatively uncommon, is also often found among the flocks of Lesser kestrels and Amur falcons. A significant portion of the global population of both falcons and the Lesser kestrel, migrate from their summer breeding grounds in the

northern hemisphere to overwinter in the southern African region. Both the falcons and Lesser kestrels tend to roost communally in groups of trees, sometimes in traditional roosts that can accommodate hundreds to thousands of birds.

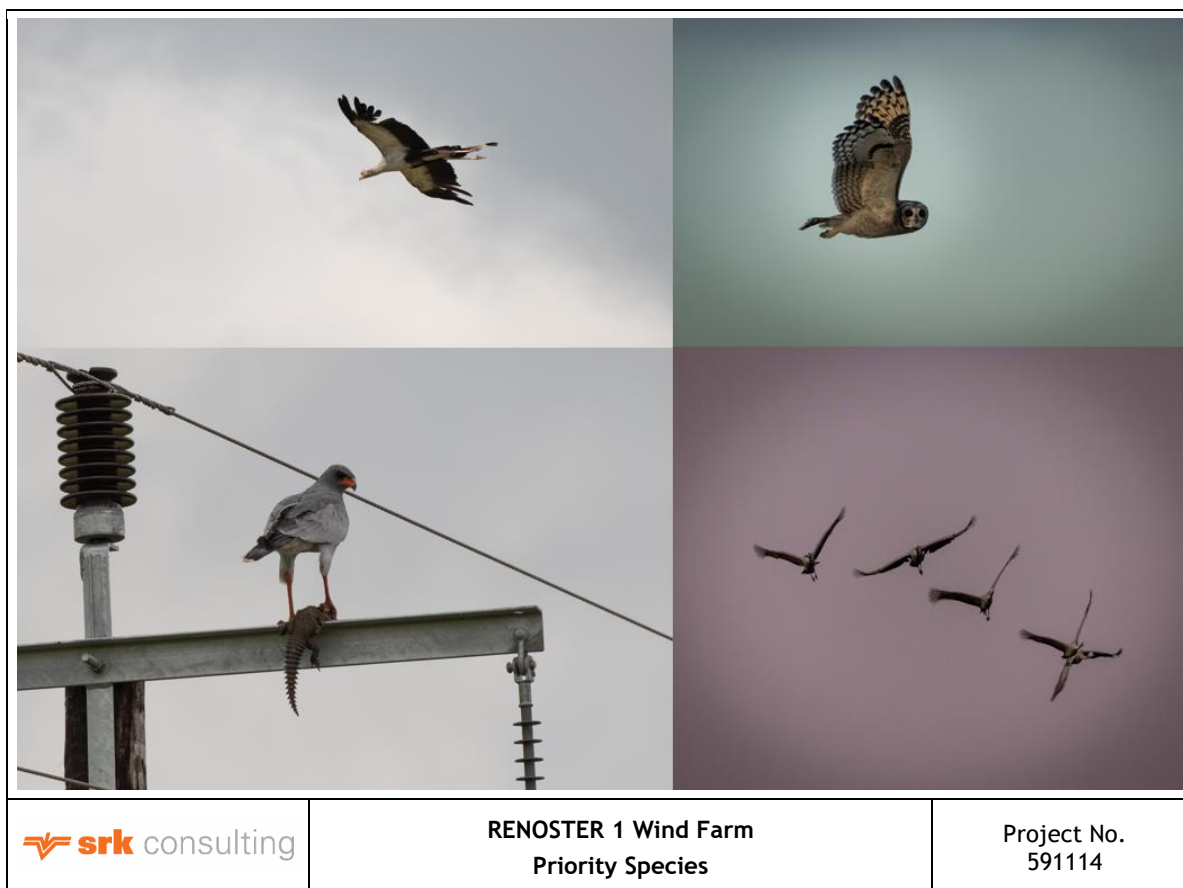


Figure 6-22: Some priority species observed on the Renoster 1 project site (clockwise top left to bottom left): Secretarybird, Marsh owl, Blue crane, Pale chanting goshawk

Source: (Froneman & Loftie-Eaton, 2024).

***Glareola nordmanni* Black-winged pratincole (NT)**

The Black-winged pratincole is a non-breeding Palearctic migrant. From mid-November to March, nearly the entire global population of these birds can be found in southern Africa, mostly in the Highveld grassland region of South Africa. They are very social, often gathering in flocks numbering in the thousands. They are usually found in open grasslands, on the edges of wetlands, and in agricultural fields. There is evidence of decline in Europe, West Africa, and Central Asia and the global status of NT has been adopted as the regional status. The Black-winged pratincole is listed in Appendix II of the Bonn Convention and is protected under the Convention on the Conservation of Migratory Species.

***Anthropoides paradiseus* Blue crane (NT)**

The national bird of South Africa, the Blue crane is mostly found in South Africa, with a small population (less than 1%) also occurring in Namibia. Blue cranes typically inhabit dry grasslands and open grassland areas, as well as agricultural landscapes. They usually roost communally during the winter non-breeding season near wetlands or dams with concentrated movements in and out of the roosts during crepuscular periods. Blue cranes are vulnerable to habitat loss and disturbance. Blue cranes have also been recorded on site and make extensive use of roost sites in the project area (Figure 6-23).

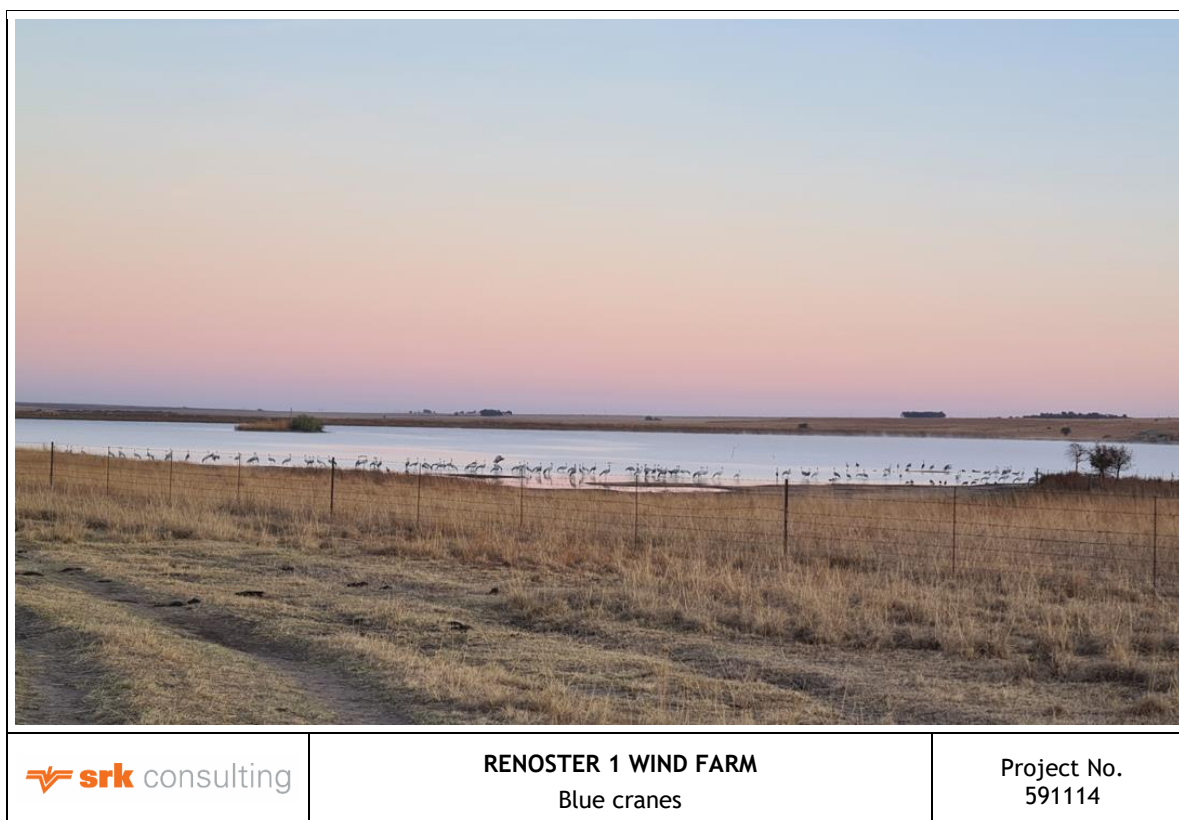


Figure 6-23: Blue cranes roosting at a dam in the project site

Source: (Froneman & Loftie-Eaton, 2024)

Secretarybird *Sagittarius serpentarius* (VU)

The Secretarybird (Figure 6-24) is not considered migratory, but it does move around in response to changes in rainfall, grassland conditions and fires. This iconic species prefers open grassland and scrub, and it can also be found in the Savannah Biome. Recently uplisted to EN at a global level, Secretarybird numbers are declining across its range largely due habitat loss and disturbance. Secretarybirds use the tops of low, flat-topped thorn trees (where available) for roosting and nesting and may nest at any time of year when food is abundant. Secretarybirds have been recorded on-site and several probable nest structures were identified, although none of these were actively used during the monitoring period.

6.1.9.8 Bats

6.1.9.8.1 Introduction

Bats form part of the order Chiroptera and are the second largest group of mammals after rodents. They are the only mammals to have developed true powered flight, with forelimbs modified into wings that afford bats a high level of aerial agility and manoeuvrability. Species-specific facial features used for echolocation vary considerably, enabling bat species to exploit a wide range of navigation and feeding strategies. Most South African bats are insectivorous and are the predominant predators of nocturnal flying insects. This ecological service is vital to the control of insect populations, which include agricultural pests, such as moths, and vectors for disease, such as mosquitoes.

Bats require reliable and abundant food sources, accessible open water and roosting spaces in their environment. The dependency on these factors varies according to the behaviour of individual species, but bat activity, abundance and diversity are likely to be higher in areas supporting all three factors.

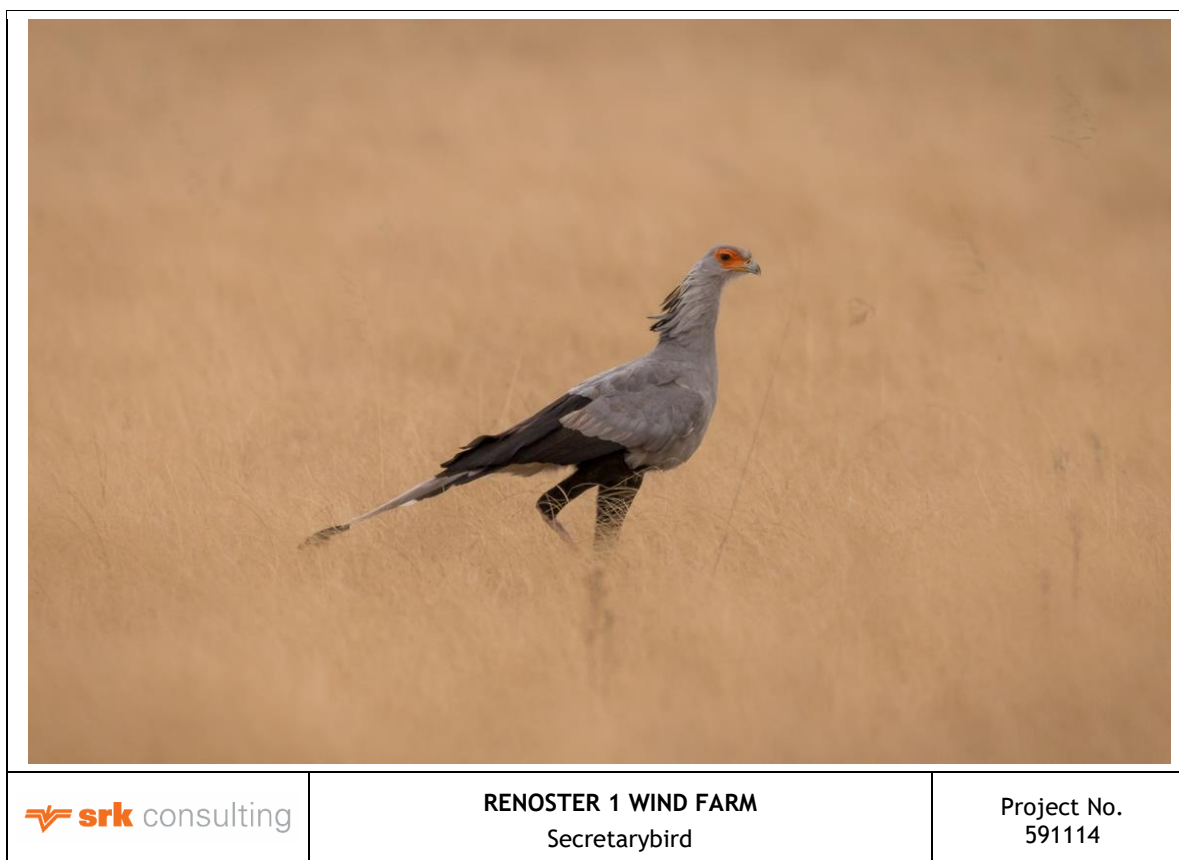


Figure 6-24: A Secretarybird on the project site

Source: (Froneman & Loftie-Eaton, 2024).

Many species of bats roost in large communal groups, congregated in small areas, so disturbance of a single roost can affect significant numbers of bats from multiple communities. In addition, while bats are relatively long-lived (up to 30 years) and have few natural predators, they produce only one or two pups per female per annum. While undisturbed bat populations may slowly increase over time, they are not able to quickly recover from mass mortalities and major roost disturbances. Urban development and agricultural practices have contributed to the decline of bat populations on a global scale. Negative public perceptions and a lack of awareness of their ecological importance contributes to limited funding for research and conservation of these animals.

6.1.9.8.2 Suitability of Habitat at the Project Site

Highveld grassland habitats are associated with a wide insect diversity and abundance, ensuring abundant prey for bats. Additionally, anthropogenic modification of the environment for farming, through the provision of permanent artificial water sources such as dams and reservoirs and favourable conditions for insect prey resulting from congregations of cattle, improves the suitability of the area for bats. Roosting potential across the project area is low to medium in the natural environment as there are few large trees and no known caves in the area³⁰, restricting roosting to aardvark burrows and similar structures. However, buildings and groves of large, non-indigenous trees that are often associated with farmsteads provide an abundance of roosting habitat, raising the roosting potential of the area to medium to high.

³⁰ The closest known caves are ~150 km north of the study area. Two possible cave roosts are located ~73 km northwest of the study site within the Vredefort Structure based on records.

One roost comprising 11 bats (*Tadarida aegyptiaca* and *Laephotis capensis*) was found in the ceiling of a building on the Farm Siberia on the Renoster 1 Wind Farm site (Figure 6-25). No other roosts were detected.



Figure 6-25: Known bat roost, Roost Siberia

Source: (Marais, Smith, & Welch, 2024)

Sensitive areas of the Renoster Wind Farms project area, based on behaviour and habitat preferences of the bat species most commonly occurring on site are described in Table 6-5.

Table 6-5: Sensitive features for bats in the project area

Sensitivity Feature	Motivation
High Sensitivity	
Man-made structures and buildings, especially farmsteads.	Such structures can offer roosting space, especially in buildings with ceilings. In combination with garden vegetation (especially if irrigated), it also offers roosting space with a reliable source of insect prey.
Larger pans and depressions.	Larger pans can hold water for longer periods and may also attract insect prey.
Valleys and drainage areas (streams and rivers) with associated dams, especially if surrounded by riparian vegetation.	Available water and moisture will attract insect prey. Valleys offer shelter from wind, thereby promoting insect activity and bat foraging. Fruit bats are more likely to utilise riparian vegetation for roosting and even foraging.
Bat roosts	Roosting spaces are important for breeding bats.
Medium Sensitivity	
Smaller farm buildings and structures	These structures can offer roosting spaces, especially buildings with ceilings. However, the lack of garden vegetation offers fewer foraging opportunities in the immediate vicinity.
Seasonal drainage lines	Seasonally available moisture may attract insect prey over shorter periods.
Smaller and less dense clumps of trees	These features may offer some foraging opportunities, but less so than large clumps of large trees. Roosting potential of these features is also low.

Source: (Marais, Smith, & Welch, 2024)

6.1.9.8.3 Bat Diversity at the Project Site

Bat species detected on at the Renoster 1 Wind Farm site are *Tadarida aegyptiaca*, *Miniopterus natalensis*, *Laephotis capensis* and *Eptesicus hottentotus*. Additionally at least one member of the Rhinolophidae family and other members of the Vespertilionidae and Miniopteridae families were detected on site but could not be identified to species level. The most abundant bats detected in the wider project area are described below.

***Tadarida aegyptiaca* Egyptian free-tailed bat (LC)**

The Egyptian free-tailed bat is found throughout Africa through to south Asia. It is widespread and abundant throughout most of southern Africa, occurring in all nine provinces of South Africa (<https://speciesstatus.sanbi.org/assessment/last-assessment/2234/>). The Egyptian free-tailed bat forages over a wide range of habitats, flying above the vegetation canopy. Its presence is strongly associated with permanent water bodies due to concentrated densities of insect prey.

This bat species roosts communally in small (dozens) to medium-sized (hundreds) groups in rock crevices, under exfoliating rocks, in hollow trees and behind the bark of dead trees. It has also adapted to roosting in buildings, in particular in roofs of houses. Maternity colonies are apparently established by females in November.

The Egyptian free-tailed bat is considered to have a high risk of fatality due to wind turbines and a moderate to high numbers of mortalities have been recorded at operating wind farms in South Africa.

***Laephotis capensis* Cape serotine bat (LC)**

The Cape serotine bat is found in high numbers and is widespread over much of Sub-Saharan Africa. This species is tolerant of a wide range of environmental conditions and are amenable to habitat changes. They are clutter-edge foragers, meaning they prefer to hunt around the edges of stands of taller vegetation, but can occasionally forage in open spaces.

This bat species roosts individually or in small groups in a variety of shelters, such as under the bark of trees, and inside the roofs of houses, making use of most man-made structures as day roosts. They mostly give birth to twins during late October and November.

The Cape serotine bat is considered to have a medium risk of fatality due to wind turbines, and moderate to high numbers of mortalities have been recorded at operating wind farms in South Africa.

***Miniopterus natalensis* Natal long-fingered bat (NT)**

The Natal long-fingered bat occurs widely across the country but mostly within the southern and eastern regions. This bat is a cave-dependent species and occurs in large numbers (approximately 260 000 bats have been observed making seasonal use of the De Hoop Guano Cave in the Western Cape). Culverts and mines are also used roosting sites for either single bats or small colonies. Separate winter hibernation roosts and summer maternity roosts are utilised, with migrations taking place between these roosts. Little is known about actual migratory behaviour, but migration distances are thought to exceed 150 kilometres.

The Natal long-fingered bat is considered to face a medium to high risk of fatality due to wind turbines. based on broad ecological features but excluded migratory information. Low to moderate mortalities have been recorded at operating WEFs in South Africa.

6.1.9.8.4 Bat Activity in the Project Area

Bat activity data in the project area has been analysed for the first five months of a 12-month monitoring programme that is being undertaken for the project area. Bat passes³¹ were recorded and classified as near to species level as possible. Interim findings based on the preliminary data collected for the project area are as follows:

- Bat activity is generally inversely proportional to height above ground: bat activity across all species was greatest at 7m above the ground and decreased with height to the lowest activities recorded at 120m (the highest detector). However, this activity is not consistent across species. *T. aegyptiaca*, which occurs commonly in the project area, is an open-air forager and was found to be most active at heights corresponding with the rotor swept zone, while bat species at lower risk of turbine collision were found to be more active at lower heights. This means that the lower the rotor swept zone, the more likely a turbine is to impact on a wider diversity of bat species; and
- Peaks of average hourly activity in February and March 2024 are attributed to breeding behaviour for *L. capensis* and *M. natalensis* and increased foraging behaviour before winter for *T. aegyptiaca*.

6.2 Socio-Economic Environment

6.2.1 Introduction

The Renoster 1 Wind Farm site is located within the Ngwathe LM which forms part of the FDDM. The main towns near the project site are:

- Edenville (bordering on, and almost surrounded by, the western part of the cluster) in the Ngwathe LM;
- Heilbron (~23km from the site's northern boundary) in the Ngwathe LM;
- Koppies (~22km from the site's north-western boundary) in the Ngwathe LM;
- Mamafubedu (Petrus Steyn) (~33km from the site's eastern boundary) in the Nketoana LM;
- Lindley (~37km from the site's southern boundary) in the Nketoana LM;
- Kroonstad (~36km from the site's western boundary) in the Moqhaka LM; and
- Steynrus (~44km from the site's southern boundary) in the Moqhaka LM.

Socio-economic baseline data is mainly presented for the FDDM, Ngwathe LM, Moqhaka LM and the Nketoana LM. The main information sources used were municipal socio-economic profiles based on Census 2011 and Census 2022 data along with municipal planning documents.

6.2.2 Land use

Current land use in the wider area is dominated by agriculture with a few tourism establishments and smaller (private) protected areas present in the district. Although the Free State Growth and Development Strategy (FSGDS) recognises the importance of the province's cultural and scenic landscapes as assets that underpin tourism, the project site is not within or near the identified tourism potential zones and corridors identified in the FSGDS.

³¹ A bat pass is defined as a sequence of ≥ 1 echolocation calls where the duration of each pulse is ≥ 2 ms (one echolocation call can consist of numerous pulses). A new bat pass is identified by a $> 1\,000$ ms period between pulses.

6.2.3 Demographics

In 2022, the Ngwathe LM had a population of 134 962, increasing from 120 250 in 2011 (1.03% growth rate, exceeding the 0.4% growth rate in the FDDM). The population of the Nketoana LM grew by almost 0.9% from 2011 to reach a population of 66 488 in 2022. The Moqhaka population contracted slightly between 2011 (160 532) and 2022 (155 410). Estimated populations of smaller towns near the site are as follows (Independent Economic Researchers, 2024):

- Ngwathe and Edenville – 6 294;
- Kroonstad and Maokeng – 97 780;
- Heilbron and Phiritona – 24 713; and
- Koppies and Kwakwatsi – 13 803.

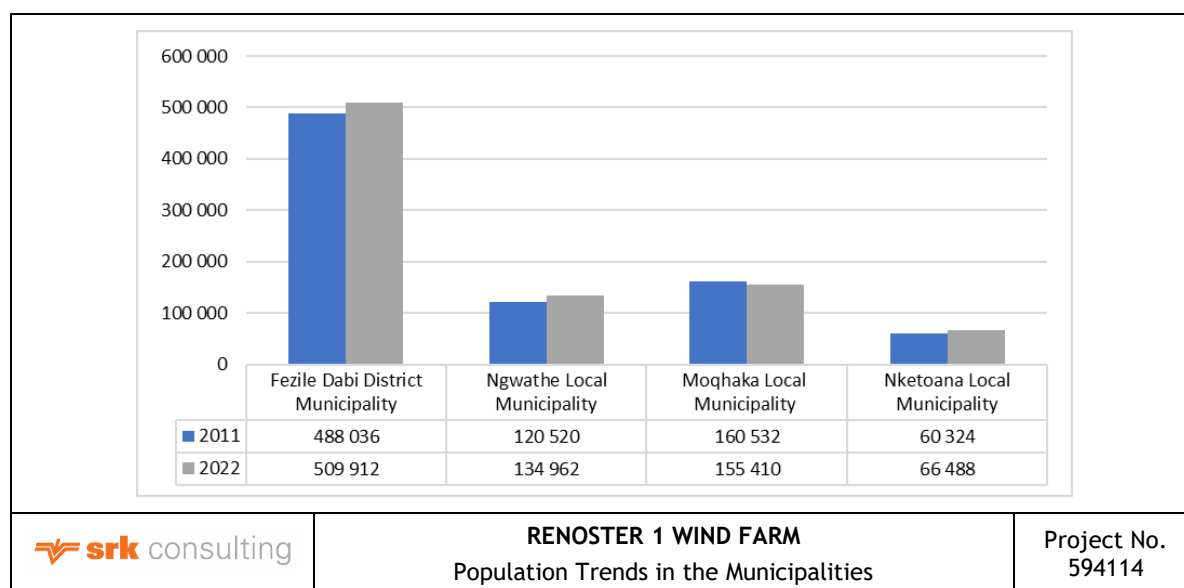


Figure 6-26: Population trends in the municipalities

Source: (Independent Economic Researchers, 2024)

Dependency ratios³² in Ngwathe LM and Nketoana LM decreased over time as a growing proportion of the population fall into the working age group (see Figure 6-27). The overall dependency ratio in the Ngwathe LM reduced from 60 in 2011 to 56 in 2022, with 64% of the population falling into the working age category. A similar pattern applies to the Nketoana LM. Dependency ratios remained approximately the same between 2011 and 2022 for the FDDM and Moqhaka LM.

³² Ratio of people not in the labour force (under the age of 15 and older than 64) to those in the labour force (ages 15 to 64).

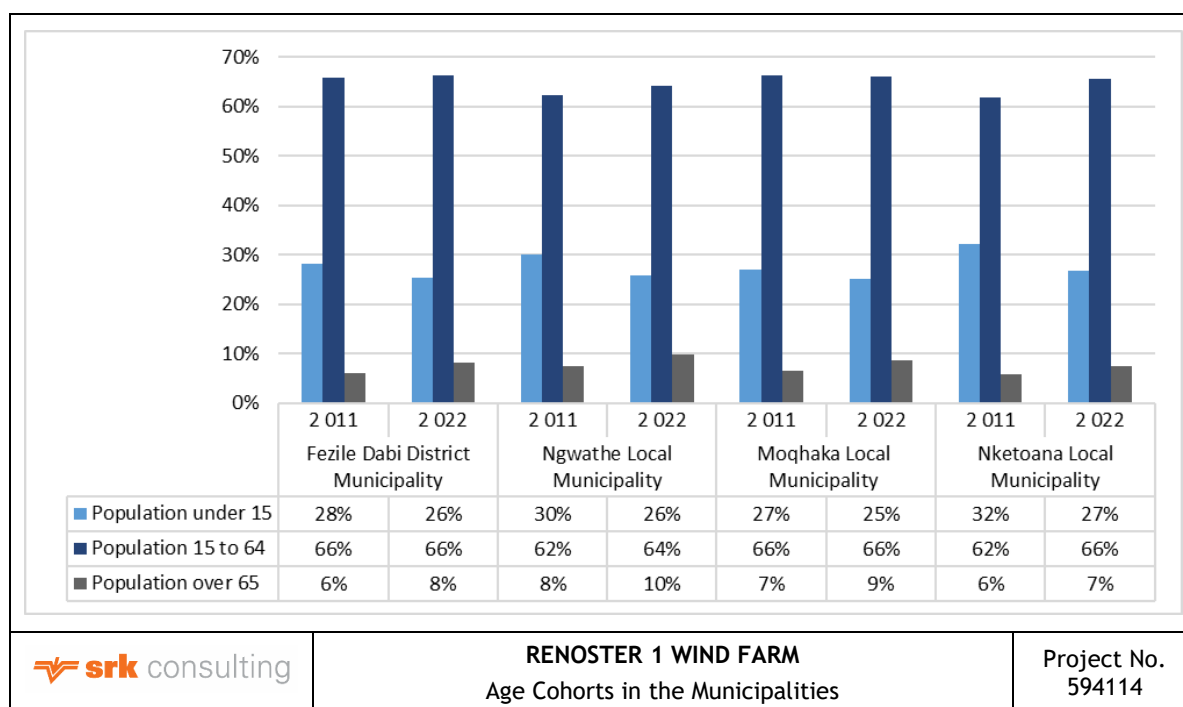


Figure 6-27: Age cohorts in the municipalities

Source: (Independent Economic Researchers, 2024)

6.2.4 Employment

In the absence of more recent data, it is estimated that the local unemployment levels possibly exceed national unemployment levels (33% national unemployment and 45% youth unemployment) considering the likely deterioration in local employment conditions since 2011 (when local unemployment levels were as high as current national unemployment statistics) (see Figure 6-28). Community services and households provide the largest portion of formal employment in the FDDM (see Figure 6-29). Agriculture (16% of jobs) and trade (13% of jobs) employed the most people (among productive sectors) in 2018.

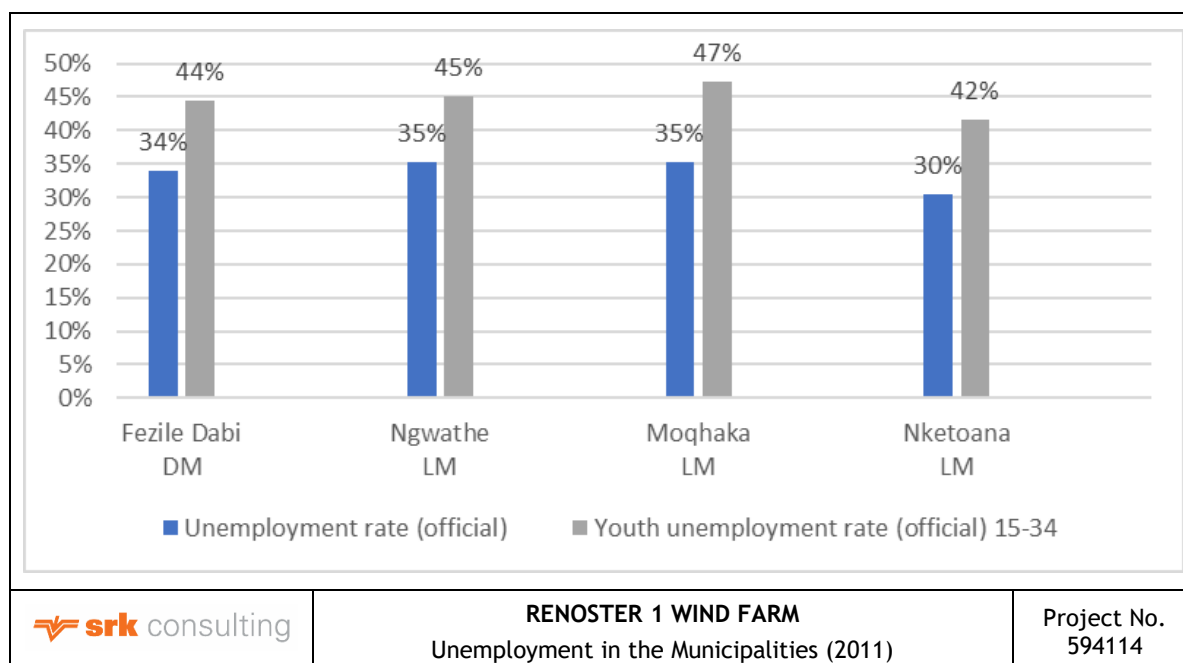


Figure 6-28: Unemployment in the municipalities (2011)

Source: (Independent Economic Researchers, 2024)

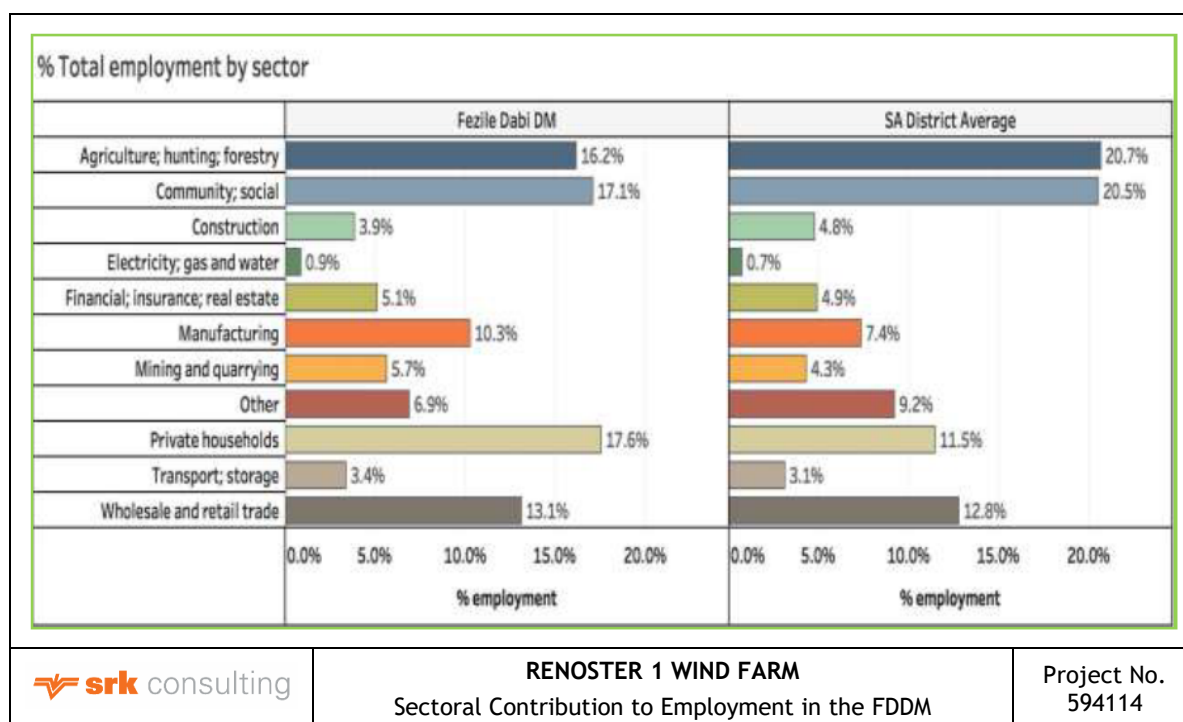


Figure 6-29: Sectoral contribution to employment in the FDDM

Source: (Independent Economic Researchers, 2024)

6.2.5 Education

Between 2011 and 2022, the proportion of people over the age of 20 with no schooling decreased for all the municipalities although it still remained high, especially for the Nketoana LM (12% in 2022). The proportion of people with higher education increased for all the municipalities between 2011 and 2022, except for the Nketoana LM which remained at 7%.

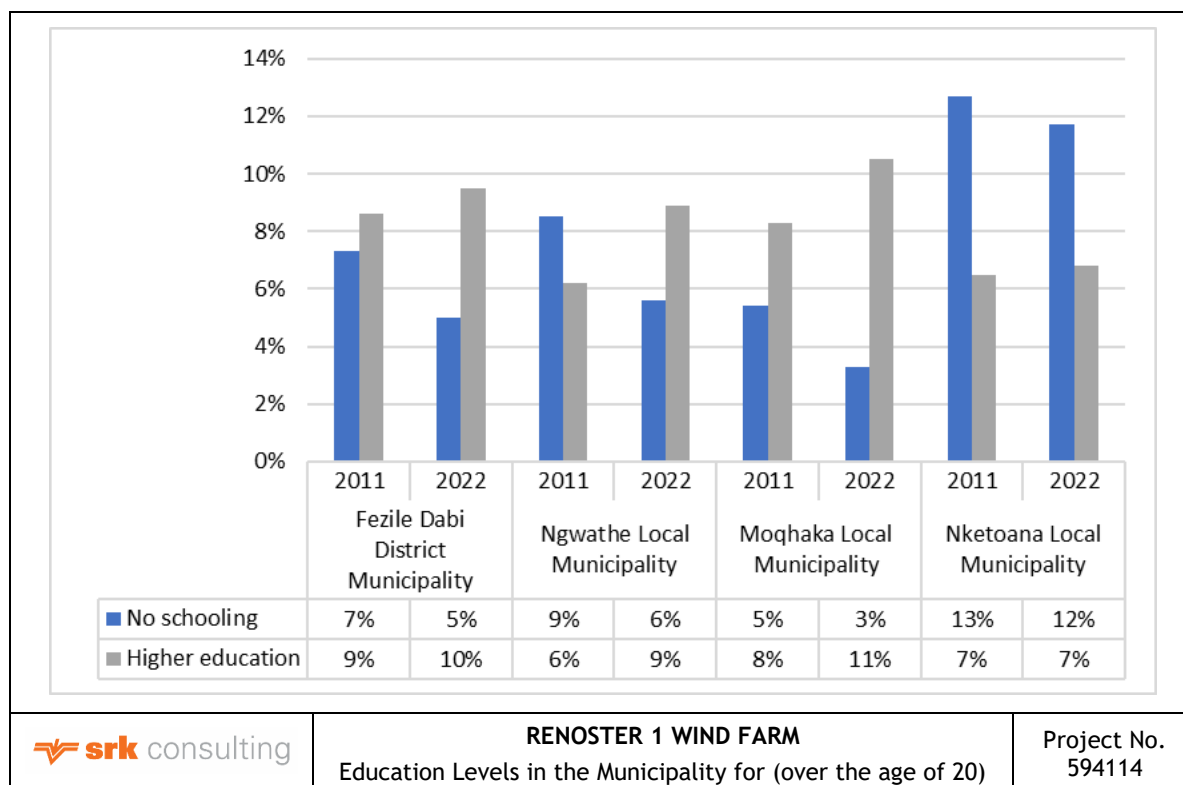


Figure 6-30: Education levels in the municipality (over the age of 20)

Source: (Independent Economic Researchers, 2024)

6.2.6 Housing and Services

The proportion of formal houses improved between 2011 and 2022, with the Ngwathe and Nketoana LMs showing significant improvements (10% improvement each – see Figure 6-31). Access to basic services also improved across all the municipalities between 2011 and 2022 (see Figure 6-32).

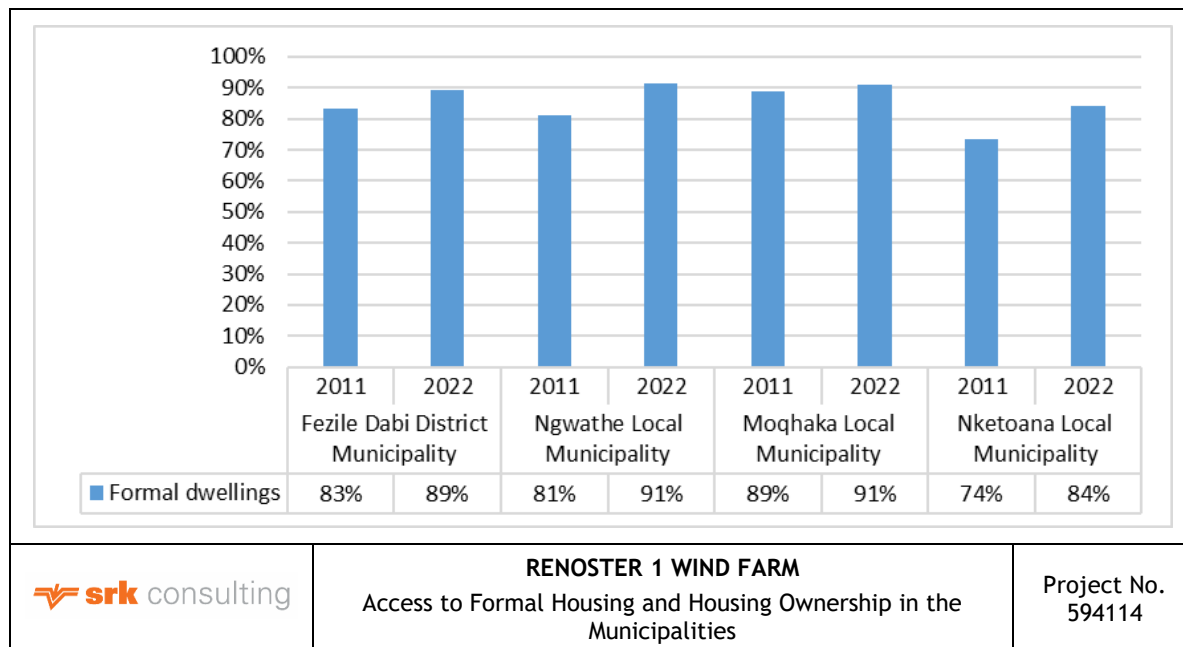


Figure 6-31: Access to formal housing and housing ownership in the municipalities

Source: (Independent Economic Researchers, 2024)

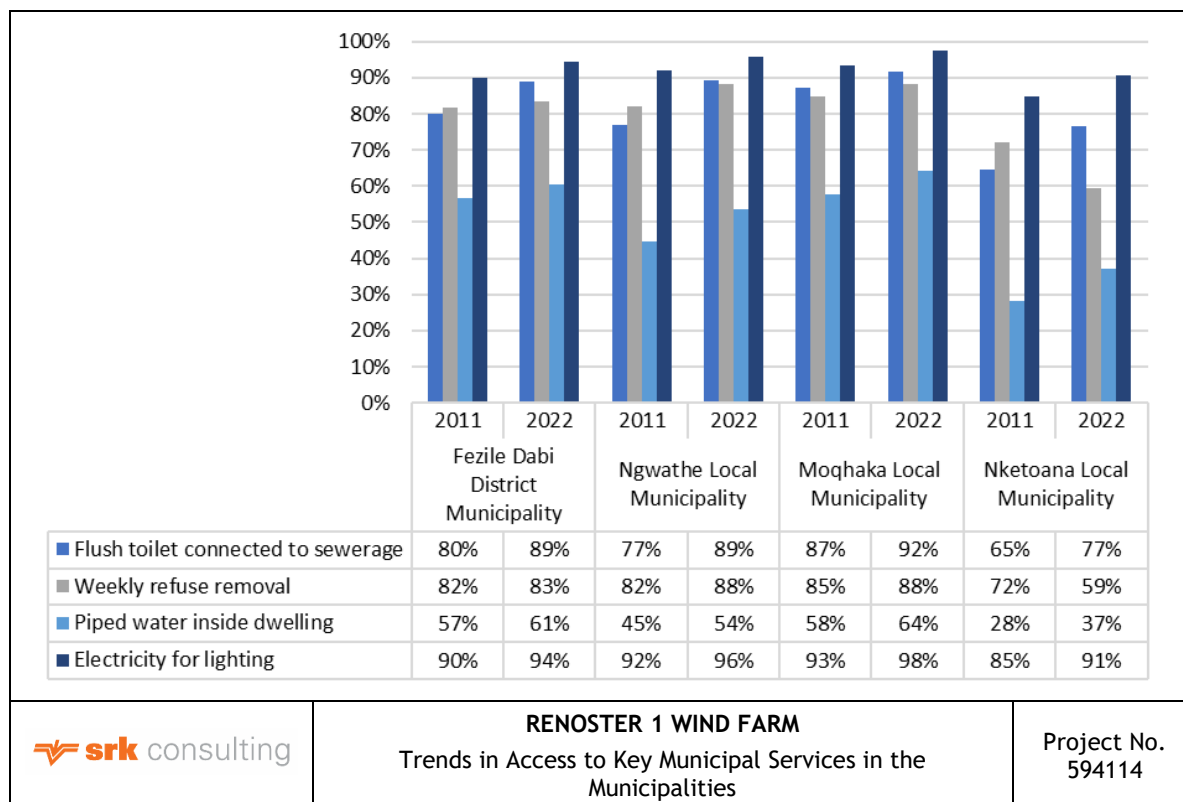


Figure 6-32: Trends in access to key municipal services in the municipalities

Source: (Independent Economic Researchers, 2024)

6.2.7 Traffic and Transport

6.2.7.1 Road Network

Two major roads traverse the project area – the R34 and R720.

The R34 is surfaced Class 2 road³³ and connects Vryburg and Richards Bay via Kroonstad and Newcastle. It is one of the longest provincial routes in South Africa, traversing three provinces (North West, Free State and KwaZulu-Natal), and is a crucial link for inter-provincial logistics and the agricultural community, rendering it particularly busy during harvest times. The R34 is in particularly poor condition in the region of Edenville – numerous ‘pothole alerts’ have been recorded in recent years and in June 2023, a coalition of farmers in the Free State pooled resources to fix potholes along this route (see Figure 6-33) (Zutari (Pty) Ltd, 2024).

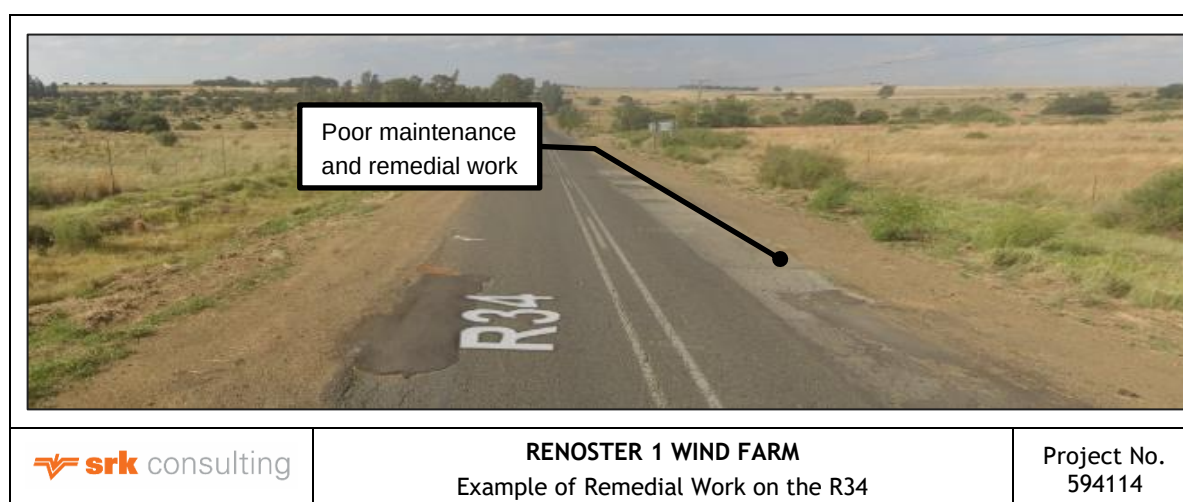


Figure 6-33: Example of remedial work on the R34

Source: Zutari (Pty) Ltd (2024)

The R720 is a regional route in the Free State that connects Vredefort with Senekal via Koppies, Edenville and Steynsrus. For most of its routing through the Renoster 1 Wind Farm project site, the R720 joins with the R34. Just west of Edenville, the roads split and the R720 continues southward to Steynsrus. Some sections of the R720 north of Steynsrus are surfaced but are very degraded and ultimately the hard surfacing terminates 2 km outside Steynsrus (see Figure 6-34). About 8 km north of Edenville, the roads split, with the R720 continuing north to Koppies. This section of the R720 is gravel (see Figure 6-35) (Zutari (Pty) Ltd, 2024).

6.2.7.2 Traffic Volumes and Flow

The South African National Road Agency (SANRAL) counting station (634: Kroon Ultra City) at the R34 x N1 interchange in Kroonstad was used to establish baseline traffic patterns in the area. The counting station captures the volume of traffic on the interchange ramps to and from the R34 link to Edenville. It reports average daily traffic as well as a ‘highest traffic stream volume’ – the highest volume of traffic recorded for a particular direction in one hour – which represents a worst-case scenario for traffic in the area.

The traffic flow in and around the project site is generally light, with most roads experiencing normal traffic conditions. During peak hours (typically from 07:00 to 08:00 in the morning and 16:00 to 17:00

³³ A Class 2 road is an expressway with a free flow speed of 80 km/h and a capacity of 1 200 (veh/h/ln).

in the evening), traffic can be slightly heavier, but overall, the peak hour impact on daily traffic is minimal (Zutari (Pty) Ltd, 2024).

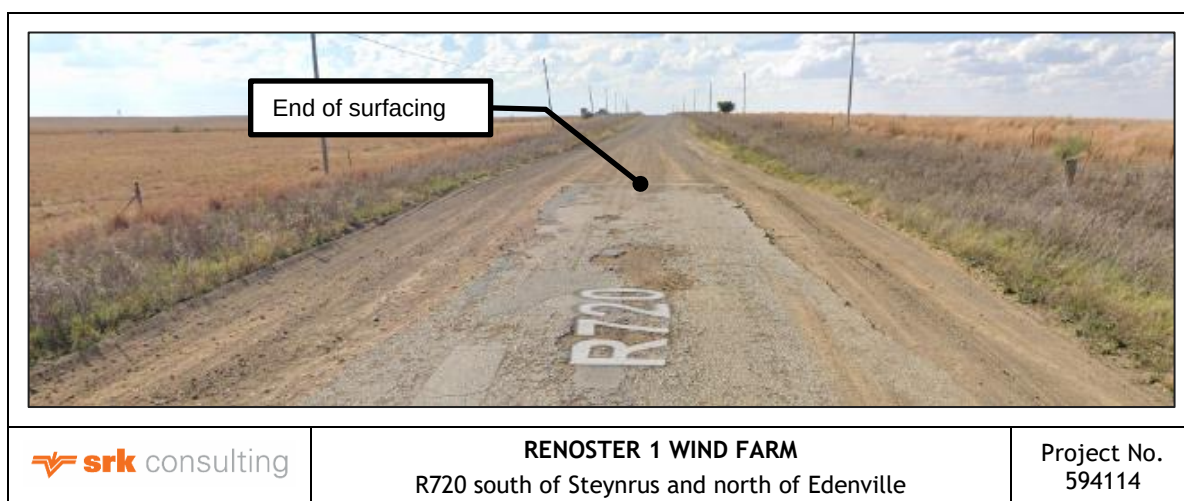


Figure 6-34: R720 north of Steynrus and south of Edenville

Source: Zutari (Pty) Ltd (2024)



Figure 6-35: Intersection R34 x R720

Source: Zutari (Pty) Ltd (2024)

6.2.7.3 Site Access

The site can be accessed directly off the R34 and R720 as well as off minor gravel roads, marked as A, B and C in Figure 6-36.

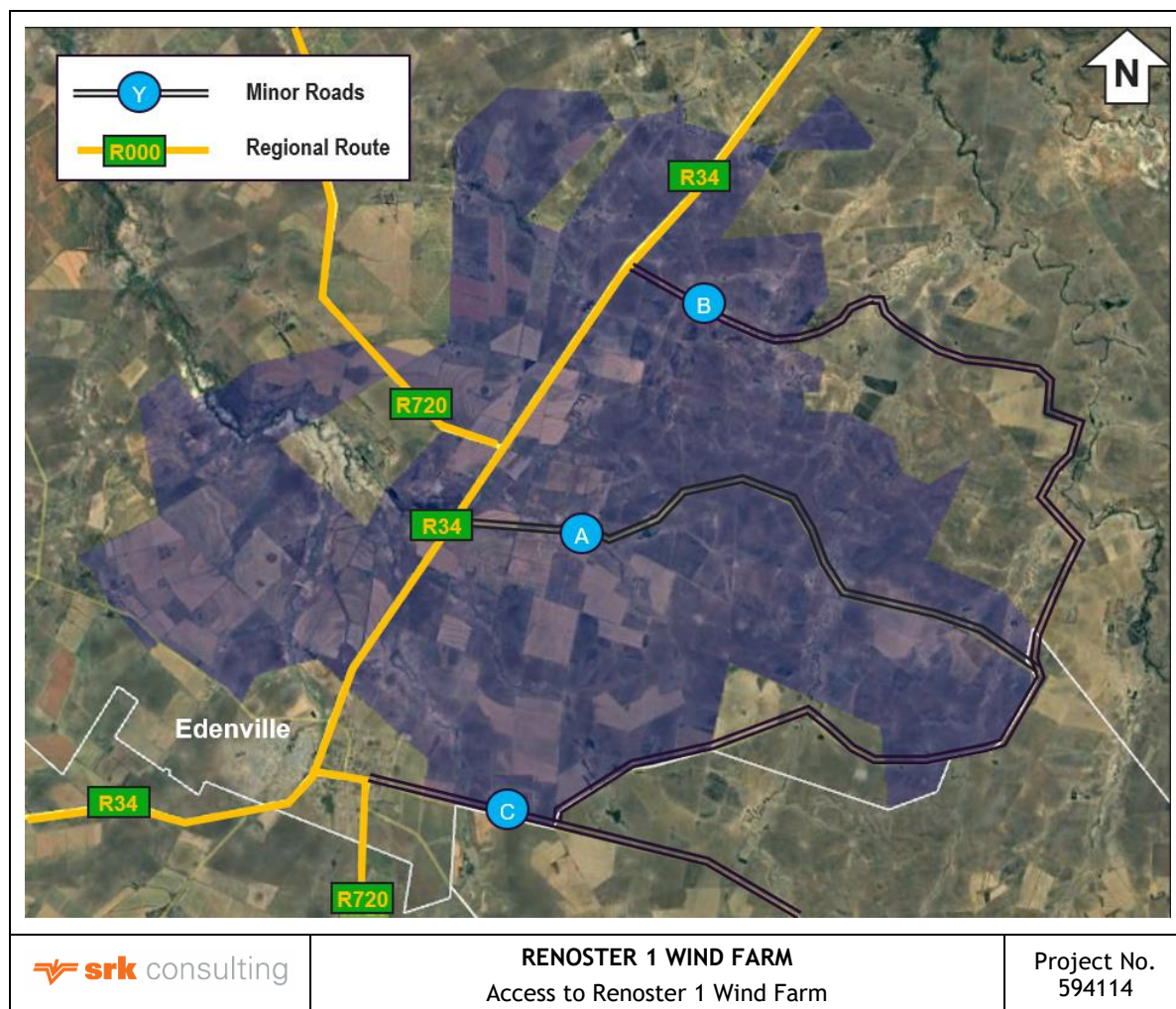


Figure 6-36: Roads traversing the Renoster 1 Wind Farm site

Source: Zutari (Pty) Ltd (2024)

6.3 Historical and Cultural Environment

6.3.1 Palaeontology

In the eastern part of the Karoo Basin, the Adelaide Subgroup comprises part of the Volksrust Formation that unconformably underlies the late Permian Normandien Formation (previously known as the Estcourt Formation). The Adelaide Subgroup comprises terrestrial deposits that originated from weathering of the Cape Fold Mountains. Abundant red mudrocks and sedimentary structures indicate fluvial (riverine) deposition while some strata (layers) probably represent a delta-plain type environment. Channel deposits are indicated by sandstones while bank deposits are indicated by mudstones. The Adelaide Subgroup is therefore classified as having a high palaeontological sensitivity, as it may preserve fossils.

The Normandien Formation has a rich fossil flora, comprising the dominant genus *Glossopteris*, as well as lycopods (club mosses), sphenophytes (horsetails), ferns, early gymnosperms (cone-bearing seed plants) and silicified wood, as well as a diverse insect fauna. Vertebrates are not common in this formation but dicynodontoids, therocephalians and cynodonts are present, comprising the *Daptocephalus* Assemblage Zone. Other vertebrate taxa recorded include fish, amphibians, parareptiles, eureptiles, biarmosuchians, anomodontians, gorgonopsians and therocephaleans.

Large exposures of Jurassic dolerite dykes occur throughout the area. These igneous (volcanic) rocks intruded through the Karoo sediments around 183 million years ago. Volcanic rocks do not preserve

fossils, and in fact they destroy any fossils in their immediate vicinity. During the Cenozoic and Quaternary periods, phases of uplift and erosion of rocks as well as weathering processes produced the sands, soils and alluvium that cover most of the land surface today. Soils do not preserve fossils either.

In the project area, only undisturbed and unweathered mudstones of the Adelaide Subgroup would preserve any fossils. However, these underlying sedimentary deposits are almost completely covered with soils with few exposures of these mudstones. Where ridges and rocky outcrops are present on site, these are mostly composed of sandstone or dolerite and thus do not contain fossils. Mixed rocky outcrops observed along watercourses comprised dolerite boulders and gravel. No outcrops of shales or mudstones that may preserve fossils were encountered in the project area by the palaeontologist, barring one small outcrop of shale on the side of a road, which was examined but no fossils were found.

6.3.2 Archaeology and Historical Record

The following archaeological artifacts are known from in areas surrounding the project site:

- Cornelia, an Early Stone Age Acheulean³⁴ site, located northeast of the site;
- Florisbad, a skull of an archaic human, with Middle Stone Age tools was discovered southwest of the site; and
- Rock art sites found on several farms east, southeast and south of Edenville.

Very few other stone age artefacts have been reported in the surrounding area. However, evidence suggests that the north-eastern portion of the southern Highveld, just outside the site, was occupied by Early Stone Age hominids.

Ceramics associated with farmers of the Iron Age are present east of the site, indicating Iron Age presence in this region. There are three types of stonewalling associated with the Late Iron Age located near the site – Type N, Type V and Type Z. Table 6-6 provides a description of each stone wall type and their location in relation to the site.

Table 6-6: Stone wall types and location in relation to the project area

Type	Description	Location in relation to the project area
N	One or more cattle kraals are positioned centrally with walls linking them and another wall surrounding the kraal(s)	North
V	A core of cattle kraals surrounded by huts and grain bins without a perimeter wall	East
Z	Loosely circular arrangements of individual bilobial dwellings around the central area	West

Beehive Stone Huts and associated stone-walled kraals and other features occur at Sedan (39 km south of the site), which was declared a Provincial Heritage Site by the Historical Monuments Commission (now SAHRA) in 1950. These features are attributed to early Bantu communities of the Iron Age.

Historical artefacts identified at the site include:

- Evidence of farmsteads (ruins and stone foundations) associated with the settlement of the

³⁴ An archaeological industry of stone tools that were made during the Lower Paleolithic era.

Voortrekkers;

- Stone Age tools;
- Evidence of Late Iron Age settlements;
- Stone foundations and ruins; and
- Many historical buildings, mostly within farmsteads or other clusters of farm outbuildings. Some farmsteads were abandoned, but the majority are occupied and well-maintained.

A number of graves are present in the wider area of the site. These include the grave of Rev. Zaccheus Richard Mahabane (prominent in the early years of the African National Congress) in the Seeisoville Cemetery situated west of the site in Kroonstad and the Vredefort Road Concentration Camp Cemetery located ~31 km north of the site. Rev. Zaccheus Richard Mahabane's grave and the Vredefort Road Concentration Camp Cemetery were declared a National Heritage Site and Provincial Heritage Site, respectively, by SAHRA. Many other graves were recorded in the areas around and within the site.

6.3.3 Cultural Landscapes and Sense of Place

'Cultural landscape' is an increasingly important consideration in management of rural and urban settings across the world. The concept focuses on the interaction of human activity and settlement and the biophysical environment in which this occurs in this instance, the rural/pastoral landscape represents how the environment has shaped the mainly agrarian land use and the associated patterns of human habitation (SLR Consulting, 2024).

The unique quality or character of a place, its distinctiveness or strong identity gives an area an inherent 'sense of place'. The rural landscape of the site is well represented in the region and there are no unique natural features or distinctive variations in landform that make the site particularly distinctive. Large portions of the site are transformed for agriculture, with some urbanisation in the town of Edenville. There are few tourism or nature-based facilities and no recognised tourism routes in the project area (SLR Consulting, 2024).

6.4 Visual and Aesthetic Environment

6.4.1 Visual Character

Visual character is influenced by topography, vegetation and land use. Developed areas generally have lower visual character than natural landscapes.

Varying degrees of human transformation of a landscape induce differing visual characteristics. Agriculture, including commercial agriculture, the town of Edenville, roads and electricity infrastructure have transformed the visual character of the project area (SLR Consulting, 2024).

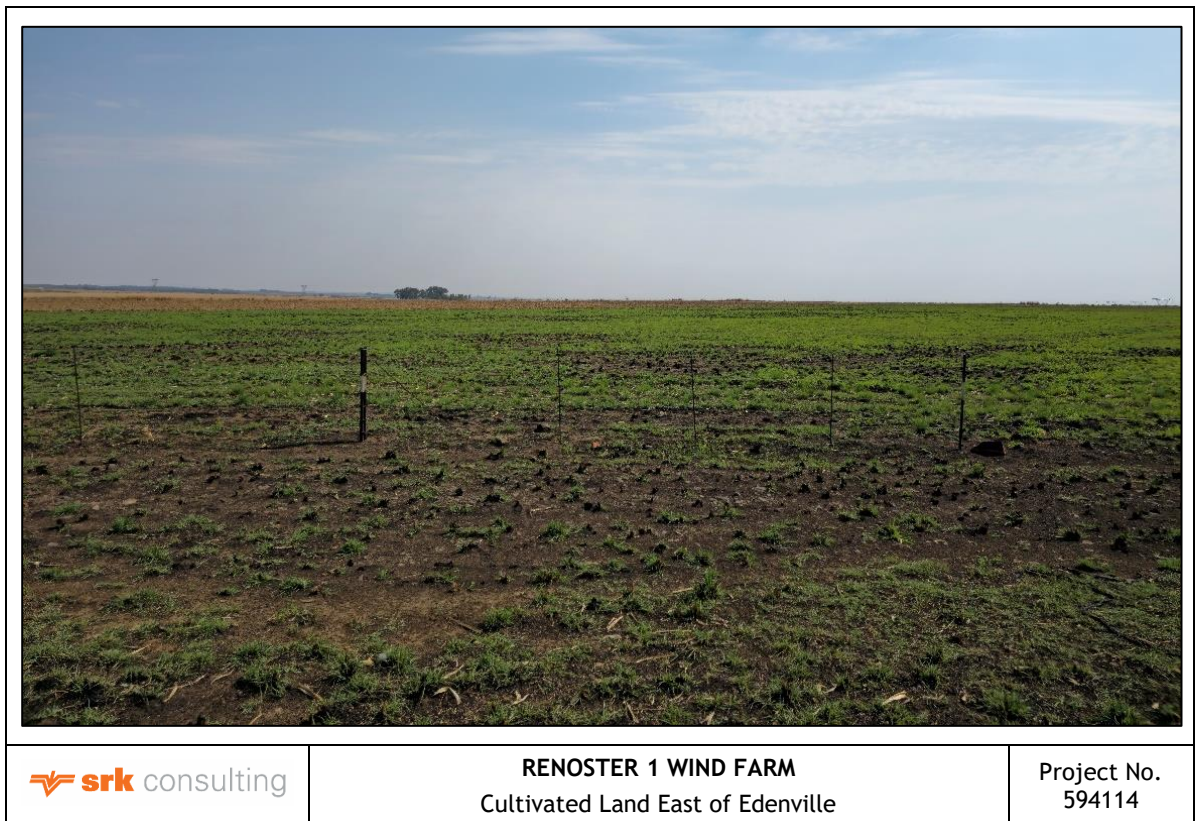


Figure 6-37: Cultivated land east of Edenville

Source: SLR (2024)

The scenic quality of the project site is influenced by the pastoral landscape and undulating terrain, which contribute to visual appeal to a certain extent (see Figure 6-38). However, there are no important or unique features in the landscape, and the landscape is well represented in the region. Furthermore, few tourism or nature-based facilities are located in the broader area, and there are no recognised tourism routes. As such, the project site is not considered to have a unique or strong sense of place (SLR Consulting, 2024).

6.4.2 Visual Absorption Capacity

Visual absorption capacity is the ability of a landscape to absorb new development without significant change to the visual character and quality of the landscape. Physical characteristics (topography and vegetation cover) and current levels of transformation are key contributors to visual absorption capacity.

Although localised topographic variations may limit views of wind turbines from some areas within the project site, the gently undulating topography and short grassland vegetation provides very little topographic shielding / screening, and the visual absorption capacity of the site for large wind turbines is considered low. Tall trees along the R34, around farmsteads and dotted across the project site will provide an element of screening (SLR Consulting, 2024).



Figure 6-38: Undulating terrain in the northeastern portion of the site

Source: SLR (2024)

6.4.3 Visual Receptors

There are no protected areas within 5 km of the project site (the maximum distance at which visual impacts are considered to be significant). However, four leisure-based/tourism facilities are located within a 5 km radius of the Renoster 1 Wind Farm: the Wilgedraai Guest Farm, Vaalkrans Game Lodge, Inloop Guest Farm and Die Riemland Gasteplaas. These receptors are considered sensitive to the development.

In general, farmsteads and residences could be regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with pastoral/natural vistas that will likely be altered by the proposed development. A total of 36 potentially sensitive receptor locations were identified within the project site (SLR Consulting, 2024).

Residential areas in Edenville are not considered visual receptors as they are located within a built-up, heavily transformed area. Roads which traverse the project area are not regarded as visual receptors as they are primarily used for local access and do not form part of any scenic tourist route (i.e. they are not specifically valued or utilised for their scenic or tourism potential).



Figure 6-39: Farmstead surrounded by tall trees in the project area

Source: SLR (2024)

7 Environmental and Social Impact Assessment

7.1 Introduction

7.1.1 Environmental Impacts Identified

The potential environmental issues and impacts of the project have been identified based on:

- The nature of the proposed activity (Chapter 2);
- Legal requirements (Chapter 3);
- Feedback received during preliminary stakeholder engagement (Chapter 5);
- The nature of the receiving environment (Chapter 6); and
- The professional experience of the EIA team.

The following key environmental issues – potential negative impacts and potential benefits – were identified:

- **Aquatic Ecology** – potential loss of wetlands and watercourse degradation mainly associated with the upgrading of existing watercourse crossings and construction of new crossings during the Construction Phase, but with possible positive impacts resulting from improvements to currently problematic crossings and a consequent reduction in erosion;
- **Terrestrial Ecology** – potential disturbance and habitat loss in ESAs, degradation of NFEPA priority sub-catchments and displacement and mortality of faunal SCC, during the Construction and Operational Phases of the development;
- **Avifauna** – potential displacement of priority species due to habitat loss and disturbance during the Construction and Operational Phases and mortality of priority species due to collisions with wind turbines and the internal reticulation network and electrocution in substations and the internal reticulation network;
- **Bats** – the loss of foraging habitat and potential bat roosts during the Construction Phase and the potential mortality of bat species due to collisions with wind turbines during the Operational Phase;
- **Socio-economic** – potential socio-economic benefits and costs to the wider community including job creation, increased investment and growth, and an increase in nuisance factors (noise);
- **Noise** – potential increased ambient noise levels at night during the Operational Phase;
- **Traffic and Transport** – potential increased risk and delays to other road users and increased rate of degradation of the road network around the site during the Construction Phase;
- **Heritage Resources** – damage to, or destruction of graves and archaeological resources, and the during the Construction Phase and alteration of predominantly rural landscape character during Construction and Operations;
- **Visual Landscape** – potential alteration of sense of place and landscape character as well as visual intrusion from the turbines themselves and night-time light pollution in the Operational Phase; and
- **Climate Change** – avoidance of GHG emissions associated with conventional thermal (coal-fired) power generation.

7.1.2 Specialist Studies Undertaken

A number of preliminary specialist studies (see Table 4-3 and below) were undertaken during the Pre-Application Phase to investigate the key potential direct, indirect, combined and cumulative impacts (negative and positive) of the proposed project and cluster, based on the preliminary layout. These studies will be updated following the Scoping Phase to consider new data, issues raised during Scoping and adjustments made to the revised layout as a result of these preliminary specialist assessments. These preliminary specialist studies are as follows:

- Geohydrology;
- Agriculture;
- Aquatic Ecology;
- Terrestrial Ecology, including:
 - Plant Species;
 - Animal Species;
- Avifauna, including:
 - Animal Species;
 - Vultures;
- Bats;
- Socio-Economic;
- Palaeontology;
- Archaeology and Cultural Heritage;
- Visual Landscape;
- Shadow Flicker;
- Noise;
- Traffic and Transport; and
- Climate Change.

These specialist reports are included as Appendices H1 – H16 to this report.

Certain impacts which SRK anticipates to be less significant and do not warrant specialist investigation will be assessed in the Impact Assessment Phase. These impacts include:

- Increased dust and associated impacts on air quality;
- Impacts on Civil Aviation;
- Impacts of Radio Frequency Interference; and
- Impacts on Defence installations.

7.1.3 Alternatives Assessed in the EIA

During the Prefeasibility Phase of most projects, various development alternatives are investigated. Furthermore, the EIA Regulations, 2014 require that all S&EIR processes must identify and describe “alternatives to the proposed activity that are feasible and reasonable”. Depending on the specific project circumstances the following alternatives may be considered:

- Site alternatives;
- Design alternatives;
- Land Use alternatives;
- Process alternatives; and
- The No-Go alternative.

A detailed discussion of the alternatives considered and assessed in this study is provided in Section 2.6. Notably, the comprehensive, iterative design process undertaken to refine the layout of the project has integrated environmental and social sensitivities with technical design from early in the project lifecycle, such that an ongoing process of alternatives analysis has been undertaken and significant avoidance of impacts has been achieved.

7.2 Impact Rating Methodology

The assessment of the significance of impacts for a proposed development is by its nature a matter of judgement. To deal with the uncertainty associated with this and ensure repeatable and comparable results, impacts of the proposed projects (during the Construction, Operation and Decommissioning Phases) were assessed and rated by all specialists according to the methodology described below.

For each predicted impact, criteria are ascribed, including the nature (positive or negative), intensity, duration, extent and probability (likelihood) associated with each impact. The methodology is quantitative, using professional judgement to assign a rating for each criterion based on a seven-point scale (refer to Table 7-1).

Note that impacts of the projects that are considered to be inconsequential (i.e. have a negligible intensity), are classified as “insignificant” and not formally rated using the assessment methodology described below.

The **consequence** of the potential impact is calculated as follows:

Consequence = nature x (intensity + duration + extent)

In order to calculate the **significance** of an impact, the **probability** (or likelihood) of that impact occurring is applied to the **consequence**:

Significance = consequence x probability

For each predicted impact, the potential **significance** of the impact must be calculated firstly with no mitigation applied and then with the recommended mitigation measure(s) in place.

Table 7-1: Assessment criteria for the evaluation of impacts

Criteria	Numeric Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years

Criteria	Numeric Rating	Category	Description
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	1	Highly unlikely/None	Expected never to happen
	2	Rare/improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain/Highly probable	It is most likely that the impact will occur
	7	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur

Based on the consequence and probability of the impact occurring, the impact will fall into a significance category of **very low** (1 – 35), **low** (36 – 72), **medium** (73 – 108) or **high** (109 – 147) as described in Table 7-2.

Table 7-2: Interpretation of significance

Interpretation of Significance		
High -	High +	These beneficial or adverse effects are considered to be very important considerations and are likely to be material for the decision-making process.
Medium -	Medium +	These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such issues may become a decision-making factor if leading to an increase in the overall adverse effect on a particular resource or receptor.

Interpretation of Significance		
Low -	Low +	These beneficial or adverse effects may be experienced on the receiving environment, but natural or socio-economic processes are likely to continue. They are unlikely to be critical in the decision-making process but could be important in the subsequent design of the project.
Very Low -	Very Low +	These beneficial or adverse effects will not have an influence on the decision, neither will they need to be taken into account in the design of the project.
Insignificant		Any effects are inconsequential, therefore not requiring any further consideration.

When assessing impacts, the level of confidence in the assessment rating, the reversibility of the impact and the irreplaceability of the resource, as set out in Table 7-3, Table 7-4, Table 7-5, respectively, must also be considered and described for each impact.

Table 7-3: Definition of confidence ratings

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 7-4: Definition of reversibility ratings

Category	Description
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 7-5: Definition of irreplaceability ratings

Category	Description
Low	The resource is not damaged irreparably or is not scarce**
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

7.3 Potential Mitigation Measures

Appendix 2 of the EIA Regulations, 2014 requires that possible mitigation measures that could be applied to avoid or mitigate negative impacts and optimise positive impacts must be identified in the Scoping Report.

Where necessary, the EMPr will identify and recommend specific mitigation measures applicable to the project. In terms of GN 435 of 2019, the DFFE *Generic EMPr for the construction of substations* and *Generic EMPr for the construction of Overhead Electricity Transmission Infrastructure* will be applicable to the on-site substations and 66 kV and 132 kV overhead powerlines.

Table 7-6 identifies typical/routine mitigation measures that are likely to apply to the Renoster 1 Wind Farm project and which are over and above the generic mitigation measures included in the generic EMPrs for powerlines and substations. Furthermore, detailed mitigation measures based on specialists' preliminary assessment of the preliminary layout of Renoster 1 are presented in Sections 7.4 to 7.18.

Any additional management and mitigation identified during the specialist assessments of the final design will be reported in the EIA Report and EMPs.

Table 7-6: Typical mitigation measures

Phase	Typical management/mitigation measures
Pre-construction Phase	• Ensure all relevant permits and approvals are in place; • Establish buffer/exclusion zones; • Furnish all contractors with the relevant EMPs; • Ensure contractors have subsidiary plans in place e.g. Oil Spill Contingency Plan, Waste Management Plan etc; and • Undertake environmental awareness training.
Construction Phase	• Appoint an Environmental Control Officer (ECO) to oversee environmental management and compliance with the EMP during construction; • Maintain hazardous materials register and store all hazardous materials according to Standard Operating Procedures (SOPs); • Limit the footprint area of the construction activity to what is absolutely essential; • Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary; • Maintain diesel powered equipment in good operating condition; • Manage traffic and site access; and • Restore or rehabilitate any areas disturbed during construction.
Operation Phase	• Undertake scheduled inspections and maintenance on all WEF infrastructure; • Furnish all service providers with the EMP; • Ensure service providers have subsidiary plans in place; • Ensure all service providers are suitably qualified and experienced; • Maintain exclusion zone procedures; • Store all hazardous materials according to SOPs; and • Submit performance reports/independent EA compliance audits to authorities.

7.4 Integration of Studies and Review

The completed specialist studies and their findings have been integrated into the Scoping Report. The key findings of each specialist were evaluated in relation to each other to provide an overall and integrated assessment of the project impacts.

SRK has considered the suite of potential impacts in a holistic manner and in certain instances, based on independent professional judgement and this integrated approach, may have altered impact significance ratings provided by the specialist. Where this has been done it is indicated in the relevant section of the report.

Specialists have made recommendations for the management of impacts, and the EAP has assessed these recommendations. For the sake of brevity, only **key** (i.e. non-standard, essential) mitigation measures are presented in impact rating tables (later in this section), with a collective summary of all recommended key mitigation measures presented at the end of each discipline. Other, standard mitigation measures recommended by specialists will be integrated into the project EMPs.

7.5 Potential Geohydrological Impacts

7.5.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Geohydrological Specialist Assessment undertaken by Geoss (see Appendix H1). The purpose of the study was to assess the potential impacts of the proposed project on geohydrological resources, indicate their environmental acceptability and

recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (Geoss, 2024).

The ToR for the Geohydrological Study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the construction and operation phases, followed by a narrative description of each impact and a presentation of the assessment impact, using the prescribed impact rating methodology;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

The specialist study was conducted as follows:

- Desktop data for the area was obtained from the National Groundwater Archive, Water Authorisation and Registration System and the specialist's internal database;
- A site visit was undertaken from 16 May 2024 to 22 May 2024 to complete a hydrocensus. Boreholes in the area were observed, water quality was measured and borehole depth and yields were recorded (where available); and
- Groundwater was sampled to define the regional geohydrological conditions of the area.

7.5.2 Assessment of Potential Geohydrological Impacts

The following potential direct impacts on groundwater resources were identified for the **Construction, Operational and Decommissioning Phases**:

- GH1: Lowering of groundwater level; and
- GH2: Groundwater contamination.

7.5.2.1 Potential Impact GH1: Lowering of Groundwater Level

Construction and operational activities involving the use of boreholes or groundwater can potentially lead to the lowering of the groundwater level. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-7) (Geoss, 2024).

Table 7-7: Significance of lowering of groundwater level

Project phase	Construction and Operational	
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts
Possible mitigation*	• Yield test boreholes according to the National Standard (SANS 10299-4:2003, part 4 – Test pumping of water boreholes), which includes a step test, constant discharge test and recovery monitoring; • Use multiple boreholes to meet water requirements during construction and operation; • Use flow meters to measure the annual volume of groundwater abstracted by farmers prior to construction; • Implement and enforce water-saving techniques; and • Implement a groundwater monitoring plan at least two years prior to construction and continue to	

	monitor groundwater according to the plan throughout operations and respond to significant variances in groundwater levels or quality accordingly.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local (Construction Phase)	Extending across the site and to nearby settlements	Local (Construction Phase)	Extending across the site and to nearby settlements
	On-going (Operational Phase)	Impact will last between 15 and 20 years	On-going (Operational Phase)	Impact will last between 15 and 20 years
Intensity	Low	Natural and/or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	During the Construction Phase, should all the WEFs be concurrently constructed, the estimated combined water use will equate to ~240 000 m³ (7.61 L/s). This value is well above the average (single) borehole yield potential of the underlying aquifer. However, the extent over which the water will be required (and abstracted), is expected to reduce the volume required from any single borehole to well below the average borehole yield potential. Additional mitigation to be implemented should construction occur concurrently across the Renoster cluster is: • Spread groundwater abstraction points across the cluster for the abstraction of groundwater for the construction phase of the cluster; • Use flow meters to measure the annual volume of groundwater abstracted by farmers prior to construction; • Implement and enforce water-saving techniques; and • Source groundwater from points within the boundary of each project site (i.e., Renoster 1 Wind Farm, Renoster 2 Wind Farm, Renoster 3 Wind Farm and Renoster Grid Connection). The post mitigation impact rating for this impact should the construction phases of the cluster be combined, remains very low negative.			

*Note: Mitigation only applies if groundwater is abstracted.

7.5.2.2 Potential Impact G2: Groundwater Contamination

Turbine foundations may extend below the water table, potentially affecting groundwater quality. Cement can raise pH levels, and construction materials may leach harmful substances into the water. Excavation and dewatering during construction could also alter groundwater chemistry and increase turbidity. Concrete batching may cause groundwater contamination from wastewater containing pollutants like cement dust and chemicals.

Concrete batching and foundation construction during the Construction Phase, accidental oil spillages or fuel/hydraulic leakages during the Construction and Decommissioning Phases and operation of the BESS and potential mismanagement of O&M buildings during the Operational Phase may lead to contamination of groundwater. The low permeability of the unsaturated zone may provide some attenuation capacity in the event of an accidental oil spill or fuel leakage. Spills and leakages in areas where bedrock is close to the surface may result in indirect contamination of the fractured aquifer network, which typically has very little to no attenuation.

The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-8).

Table 7-8: Significance of groundwater contamination

Project phase	Construction and Decommissioning			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible mitigation	Construction Phase only: • Locate concrete batching plants away from springs and shallow water tables; • Ensure that water from batching activities (if used) does not degrade the current groundwater quality; • Implement barriers and / or liners where foundation casting will happen below the groundwater tables; and • Implement a comprehensive monitoring program to record water quality prior to construction and during construction to detect potential water quality degradation as soon as possible. Operational Phase only • Ensure proper storage of all electrolytes or other chemicals on site including secondary containment and leak detection systems; • Handle all chemicals on properly bunded, sealed surfaces and not on bare soil; • Remove and dispose of any hazardous waste from the BESS/substations/O&M buildings/ablution facilities in an appropriate manner; • Locate BESSs and substations at least 50 m from existing boreholes; • Ensure that wastewater from firefighting does not runoff into the environment; • Limit wastewater production by e.g. using low-flow faucets and ensure wastewater is appropriately contained and treated on site; • Use biodegradable cleaning agents; and • Monitor water quality throughout operations to detect any water quality degradation as soon as possible. Construction and Decommissioning Phases: • Service and maintain vehicles regularly and ensure that there are no leakages; • Place drip trays underneath any engines that stand in one place for an excessive length of time; • Place diesel fuel tanks (if required) above ground on impermeable surfaces in a bunded area; • Refuel vehicles and equipment on an impermeable surface in a designated area at the construction camp (if off-site refuelling is not possible); • Contain and remove spillages as rapidly as possible with correct disposal procedures of the spilled material, should they occur; and • Retain proof of disposal of spillages (waste disposal slips or waybills).			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term (Construction and Decommissioning Phases)	impact will last between 1 and 5 years	Short term (Construction and Decommissioning Phases)	impact will last between 1 and 5 years
	On-going (Operational Phase)	Impact will last between 15 and 20 years	On-going (Operational Phase)	Impact will last between 15 and 20 years

Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and / or social functions and / or processes are somewhat altered	Very low	Natural and / or social functions and / or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The post mitigation impact rating for this impact should the construction phase of the cluster be combined, remains of very low negative significance.			

7.5.3 Mitigation Measures: Potential Impacts on Geohydrology

Essential mitigation measures during the **Construction Phase** are as follows:

- Yield test boreholes according to the National Standard (SANS 10299-4:2003, part 4 – Test pumping of water boreholes), which includes a step test, constant discharge test and recovery monitoring;
- Use multiple boreholes to meet water requirements;
- Use flow meters to measure the annual volume of groundwater abstracted by farmers prior to construction;
- Implement and enforce water-saving techniques;
- Implement the groundwater monitoring plan at least two years prior to construction and continue to monitor groundwater according to the plan throughout construction and respond to significant variances in groundwater levels or quality accordingly;
- Locate concrete batching plants away from springs and shallow water tables;
- Ensure that water from batching activities (if used) does not degrade the current groundwater quality;
- Implement barriers and / or liners where foundation casting will happen below the groundwater tables;
- Implement a comprehensive monitoring program to record water quality prior to construction and during construction to detect potential water quality degradation as soon as possible;
- Service and maintain vehicles regularly to check and ensure that there are no leakages;

- Place drip trays underneath any engines that stand in one place for an excessive length of time;
- Place diesel fuel tanks (if required) above ground on impermeable surfaces in a bunded area;
- Refuel vehicles and equipment on an impermeable surface in a designated area at the construction camp (if off-site refuelling is not possible);
- Contain and remove spillages as rapidly as possible with correct disposal procedures of the spilled material, should they occur; and
- Retain on file proof of disposal of spillages (waste disposal slips or waybills).

Essential mitigation measures during the **Operational Phases** are as follows:

- Yield test boreholes according to the National Standard (SANS 10299-4:2003, part 4 – Test pumping of water boreholes), which includes a step test, constant discharge test and recovery monitoring;
- Use multiple boreholes to meet water requirements;
- Implement and enforce water-saving techniques;
- Continue to monitor groundwater according to the groundwater monitoring plan throughout operations and respond to significant variances in groundwater levels or quality accordingly;
- Service and maintain vehicles regularly to check and ensure that there are no leakages;
- Place drip trays underneath any engines that stand in one place for an excessive length of time;
- Place diesel fuel tanks (if required) above ground on impermeable surfaces in a bunded area;
- Refuel vehicles and equipment on an impermeable surface in a designated area (if off-site refuelling is not possible);
- Contain and remove spillages as rapidly as possible with correct disposal procedures of the spilled material, should they occur;
- Retain proof of disposal of spillages (waste disposal slips or waybills);
- Ensure proper storage of all electrolytes or other chemicals on site including secondary containment and leak detection systems;
- Handle all chemicals on properly bunded, sealed surfaces and not on bare soil;
- Remove and dispose of any hazardous waste from the BESS/substations/O&M buildings/ablution facilities in an appropriate manner;
- Locate BESSs and substations at least 50 m from existing boreholes;
- Ensure that wastewater from firefighting does not runoff into the environment;
- Limit wastewater production by e.g. using low-flow faucets and ensure wastewater is appropriately contained and treated on site;
- Use biodegradable cleaning agents; and
- Monitor water quality throughout operations to detect any water quality degradation as soon as possible.

Essential mitigation measures during the **Decommissioning Phase** are as follows:

- Service and maintain vehicles regularly to check and ensure that there are no leakages;
- Place drip trays underneath any engines that stand in one place for an excessive length of time;

- Place diesel fuel tanks (if required) above ground on impermeable surfaces in a bunded area;
- Refuel vehicles and equipment on an impermeable surface in a designated area at the construction camp (if off-site refuelling is not possible);
- Contain and remove spillages as rapidly as possible with correct disposal procedures of the spilled material, should they occur; and
- Retain on file proof of disposal of spillages (waste disposal slips or waybills).

7.5.4 The No-Go Alternative

The sites proposed for development are primarily used for agricultural purposes, including planting and harvesting of crops and open fields for grazing livestock. Crop farming is dependent on seasonal rain while livestock are primarily dependent on groundwater for drinking. If the WEF is not developed, these activities are expected to continue, serving as the baseline for comparison with other potential impacts.

Farming on the farm portions where the project is proposed does not utilise significant volumes of groundwater, with small-scale abstraction primarily for domestic and agricultural purposes. Therefore, the No-Go Alternative does not pose a risk to groundwater or aquifer depletion.

7.5.5 Potential Cumulative Impacts

Since there are no other major existing or planned groundwater users in the region and no known significant contamination point-sources, the cumulative impacts of the cluster combined with other existing impacts on groundwater quality and levels are negligible.

7.5.6 Impact Statement

The following conclusions were made during the groundwater impact assessment for the proposed project:

- Groundwater demand from the project is low relative to the potential regional supply. Sufficient groundwater is available to meet the water requirements for the project during the different project phases;
- Although the potential average borehole yield of the aquifer is sufficient for the water demands to be met by a single borehole it is recommended that the groundwater requirements are spread across the project area to minimise potential effects that abstraction might have of the environment and farmers actively using the groundwater;
- Several boreholes can act as a potentially viable source of groundwater for the development of the project, should the use of borehole water be considered a requirement. The use of these boreholes will depend on the construction and operational requirements of the project, negotiations with the landowners and proximity to the facility;
- If all WEFs in the cluster are to be constructed simultaneously, the utilisation of multiple boreholes on different farm portions across the proposed cluster area should still meet the water demand. Spreading the points of abstraction effectively across the entire project area will be important to minimise the effect on groundwater resources;
- Both the potential individual and combined impacts from the Construction, Operational, and Decommissioning Phases of the development are considered as **very low** with appropriate mitigation; and

- The No-Go alternative does not represent a risk to groundwater or aquifer depletion and/or contamination.

From a geohydrology perspective, it is recommended that the project be authorised given that proper mitigation measures are implemented during each phase of the project to suppress the intensity of identified impacts.

7.5.7 Recommendations for the Impact Assessment Phase

The Final Geohydrological Specialist Assessment will consider and assess the revised WEF layout.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database.

7.6 Potential Agricultural Impacts

7.6.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Agricultural Agro-Ecosystem Specialist Assessment undertaken by SoilZA (see Appendix H2). The purpose of the study was to assess the potential impacts of the project on agricultural resources, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits.

The ToR for the Agriculture study were to:

- Undertake an Agricultural Agro-Ecosystem Specialist Assessment of the preferred site and within the proposed development footprint based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past five years, that identifies:
 - The extent of the impact of the proposed development on the agricultural resources; and
 - Whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site, and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural activity.
- Describe the status quo of the site, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:
 - The soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope;
 - Where applicable, the vegetation composition, available water sources as well as agro-climatic information;
 - The current productivity of the land;
 - The current agricultural employment; and
 - Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc);
- Assess the Agricultural impact of the project, including:
 - Changes in productivity for agricultural activities;
 - Changes in employment; and

- Any alternative development footprints within the preferred site which would be of Medium or Low sensitivity for agricultural resources as identified by the Screening Tool and verified through the site sensitivity verification; and
- Produce an Agricultural Agro-Ecosystem Specialist Report that meets the criteria of GN 320 of 2020.

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 10 October 2023. It was also informed by existing climate, soil, and agricultural potential data for the site. The aim of the on-site assessment was to:

- Ground-truth cropland status and consequent agricultural sensitivity;
- Ground-truth the land type soil data and achieve an understanding of the general range and distribution patterns of different soil conditions across the site; and
- Gain an understanding of overall agricultural production potential across the site.

Soils were assessed based on the investigation of existing soil exposures in combination with indications of the surface conditions and topography. Soils were classified according to the South African soil classification system. Interviews were also conducted with several of the farmers for information on farming practices at the site (SoilZA, 2024).

7.6.2 Assessment of Potential Impacts

The following potential direct impact on agriculture was identified for the Construction, Operational and Decommissioning Phases:

- AG1: Loss of agricultural production potential.

7.6.2.1 Potential Impact AG1: Loss of Agricultural Production Potential

Net change to future agricultural production of land is the only impact of any development on agriculture. Decreased agricultural production potential primarily results when a development footprint is located on productive agricultural land. Soil erosion and degradation also reduce agricultural production potential, but these can be managed to avoid impacts (SoilZA, 2024).

The following factors determine the significance of a loss of agricultural production potential:

- Size and footprint of land from which agriculture will be excluded;
- Baseline production potential (particularly cropping potential) of that land; and
- Duration that agriculture will be excluded.

In the case of WEFs, the proportionately small development footprints result in an insignificantly small loss of future agricultural production potential, regardless of the production potential of the land. WEF infrastructure (including all associated infrastructure) typically occupies less than 2% of the site area, and in this case an even lower percentage of available agricultural land (as not all of the site is used for agricultural purposes). Minor disturbances to agriculture may occur during the construction and Decommissioning Phases, but agricultural activities can continue on all other parts of the farmland post-construction.

Wind farms have both positive and negative impacts on production potential of land. The net sum of these impacts determines the extent of the change in future production potential.

Positive impacts include:

- Increased financial security for farming operations;

- Improved security against episodic events (such as drought and floods), as well as stock theft and other crime; and
- An improved road network.

Negative impacts include:

- Prevention of crop spraying by aircraft over land occupied by turbines; and
- Interference with farming operations during the Construction and Decommissioning Phases.

A portion of the Renoster 1 Wind Farm site overlaps with a proposed PAA. However, the footprint of the proposed WEF relative to the broader site is considered to be minimal and agricultural activities will be able to continue unencumbered throughout the remainder of the site.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-9).

Table 7-9: Significance of loss of agricultural production potential

Project phase	Construction, Operational and Decommissioning			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential Mitigation	Construction Phase: • Design an effective system of stormwater runoff control where required (i.e. any points where runoff might accumulate) to effectively collect and safely divert runoff from accumulation points and prevent any potential down slope erosion; • Where possible, maintain all vegetation cover and facilitate revegetation of denuded areas throughout the site to protect disturbed soil from erosion; and • Strip any available topsoil to a depth of 40 cm from the entire surface that will be mechanically disturbed and stockpile it for even re-spreading over the entire surface during rehabilitation. Operational Phase: • Maintain a stormwater runoff control system, monitor erosion and remedy the stormwater control system in the event of any erosion occurring; and • Facilitate revegetation of denuded areas throughout the site. Decommissioning Phase: • Implement an effective system of stormwater runoff control where required (i.e. any points where runoff might accumulate) to effectively collect and safely divert runoff from accumulation points and prevent any potential down slope erosion; • Where possible, maintain all vegetation cover and facilitate revegetation of denuded areas throughout the site to protect disturbed soil from erosion; and • Strip any available topsoil to a depth of 40 cm from the entire surface that will be mechanically disturbed and stockpile it for even re-spreading over the entire surface during rehabilitation.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Almost certain/Highly probable	It is most likely that the impact will occur

Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of the three Renoster WEFs and grid connection on agricultural production potential will be confined to the broader site (i.e., will not extend beyond this area), and the intensity of the impact will not increase at this scale. Therefore, the combined impact of the project (i.e., the three WEFs and grid connection) is <i>low</i> .			

7.6.3 Mitigation Measures: Potential Agricultural Impacts

Essential mitigation measures during the **Construction Phase** are as follows:

- Design an effective system of stormwater runoff control where required (i.e., any points where runoff might accumulate) to effectively collect and safely divert runoff from accumulation points and prevent any potential down slope erosion;
- Where possible, maintain all vegetation cover and facilitate revegetation of denuded areas throughout the site to protect disturbed soil from erosion; and
- Strip any available topsoil to a depth of 40 cm from the entire surface that will be mechanically disturbed and stockpile it for even re-spreading over the entire surface during rehabilitation.

Essential mitigation measures during the **Operational Phase** are as follows:

- Maintain a stormwater runoff control system, monitor erosion and remedy the stormwater control system in the event of any erosion occurring; and
- Facilitate revegetation of denuded areas throughout the site.

Essential mitigation measures during the **Decommissioning Phase** are as follows:

- Implement an effective system of stormwater runoff control where required (i.e. any points where run off might accumulate) to effectively collect and safely divert runoff from accumulation points and prevent any potential down-slope erosion;
- Where possible, maintain all vegetation cover and facilitate revegetation of denuded areas throughout the site to stabilise disturbed soil against erosion; and
- Strip any available topsoil to a depth of 40 cm from the entire surface that will be mechanically disturbed and stockpile it for even re-spreading over the entire surface during rehabilitation.

7.6.4 The No-Go Alternative

The development complements agriculture by providing an additional income source without excluding agriculture from the land or decreasing production. The No-Go alternative forgoes the benefit of reduced agricultural risk to farmers from this additional source of income (SoilZA, 2024).

The proposed development is the preferred alternative (not the No-Go alternative) from an agricultural perspective (SoilZA, 2024).

7.6.5 Potential Cumulative Impacts

This cumulative impact assessment determines the quantitative loss of agricultural land if all renewable energy project applications within a 30 km radius of the site become operational.

Regional loss (including by degradation) of future agricultural production potential is the most significant potential cumulative agricultural impact. The area of land to be taken out of agricultural use by all (solar) projects within 30 km of the site (total generation capacity of 310 MW) is ~115 hectares³⁵. As a proportion of the total area within a 30 km radius (~282 700 ha), this amounts to only 0.04% of the surface area, well within an acceptable limit in terms of loss of agricultural land, much of which is only suitable for grazing.

The cumulative impact of loss of future agricultural production potential from the Renoster Wind Farm Development and other planned renewable energy facilities in a 30 km radius is assessed as Low (SoilZA, 2024).

7.6.6 Impact Statement

The proposed development is desirable from an agricultural perspective because it offers a valuable, win-win opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to very little loss of agricultural land. The potential benefits include increased financial security for farming operations; improved security; and an improved road network.

Since the proposed development will exclude agricultural production from an insignificantly small area of land, the agricultural impact of the development (loss of future agricultural production potential) is assessed as being of **low** significance and is considered to be acceptable. From an agricultural impact perspective, it is recommended that the proposed development be approved, subject to the implementation of the proposed mitigation measures (SoilZA, 2024).

7.6.7 Recommendations for the Impact Assessment Phase

The Final Agriculture Specialist Assessment will consider and assess the revised WEF layout.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database.

7.7 Potential Impacts on Aquatic Ecosystems

7.7.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Aquatic Biodiversity Specialist Assessment undertaken by Liz Day Consulting (see Appendix H3). The purpose of the study was to assess the potential impacts of the proposed project on aquatic ecosystems, indicate their environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (Day, 2024).

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on aquatic ecosystems at the site, and place this in a regional context;

³⁵ Calculated using the industry standards of 2.5 and 0.3 ha per MW for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA)

- Identify and assess each potential impact of the project, including impacts associated with the Construction and Operational Phases;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change; and
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project.

The following activities informed the aquatic assessment:

- Desk-top assessment of existing biodiversity spatial data, including high-resolution aerial photography and topographical survey data (5m and 0.5m contours);
- Site visits in April 2023, October 2023 and June 2024, in order to:
 - Gain an understanding of the condition, management challenges and current threats to aquatic ecosystems;
 - Ground truth desktop PES and sensitivity assessments of aquatic ecosystems at the site;
 - Conduct in situ water quality assessments, Habitat Quality assessments and SASS5 aquatic macroinvertebrate bioassessments; and
 - Collect water and soil samples for laboratory analysis; and
- Compilation of the draft aquatic specialist impact assessment report.

The project layout has been informed by iterative engagement between the specialists and the development team. As a result, many of the potential impacts to aquatic ecosystems have been avoided through layout refinements (Day, 2024). Given the size of the project site and the number of watercourses on the site, inevitably some watercourses will be impacted by the proposed development. These impacts and their significance are discussed below.

7.7.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** impacts on aquatic ecology were identified:

- AE1: Wetland loss; and
- AE2: Watercourse degradation.

7.7.2.1 Potential Impact AE1: Wetland Loss

Road construction and widening will require construction of watercourse crossings and upgrading of some existing watercourse crossings³⁶ and this will result in direct loss of wetland habitat and associated loss of wetland ecosystem services.

Many of the main public roads across the site have already triggered significant erosion at watercourse crossings, usually as a result of inappropriate culvert sizing and spacing (too few, large culverts placed too close together). Inappropriately designed watercourse crossings could trigger additional erosion resulting in further wetland loss. Wetland erosion may also occur as a result of flow diversions and other disturbances such as compaction and damage to vegetation during construction.

³⁶ None of the other planned infrastructure will result in outright wetland loss as, as all other infrastructure has been located outside of watercourses (Day, 2024).

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-31).

Table 7-10: Significance of wetland loss

Project phase	Construction			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	- Adhere to the aquatic ecology sensitivity No-Go areas when considering the placement of any infrastructure; - Avoid areas of <i>High</i> aquatic ecology sensitivity where possible; - Use existing roads as far as possible; - Allow for improvement in at least one aspect of watercourse condition at each watercourse crossing where any road upgrade is required, determined on a site-by-site basis in consultation with an aquatic ecologist during the development of detailed road design for each crossing; - Micro-site all new road crossings in consultation with an aquatic ecologist; hydrologist and roads engineer; - Design roads through seeps and source seeps to manage through-flows without causing erosion or wetland shrinkage; and - Compile, with input from an aquatic ecologist, and implement a stormwater management plan.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Medium term	Impact will last between 5 and 10 years
Extent	Regional ³⁷	Impacts felt at a regional/provincial level	Municipal area	Impacts felt at a municipal level
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low – negative	
Comment on combined Renoster cluster	The combined impacts of the cluster would be <i>medium</i> without mitigation and <i>low</i> with mitigation. With inclusion of the improvement of at least one aspect of watercourse condition at each watercourse crossing upgrade, the combined impact would be <i>very low</i> positive.			

³⁷ Impacts rated at a regional, rather than national level, despite the Critically Endangered threat status of most wetland types. This is because many of the watercourses in the study area are already degraded. However, in the absence of mitigation, the development has the potential to increase wetland loss and degradation, the impacts of which would be amplified, given current threat status.

7.7.2.2 Potential Impact AE2: Watercourse Degradation

Road construction and installation of underground cables, turbines and BESSs as well as the general increase in human and vehicle traffic within the project site may lead to wetland degradation as a result of:

- Excavation and physical disturbance in wetlands leading to compaction and/or churning of wetland soils;
- Damage to or removal of vegetation;
- Diversion of flows via drainage trenches during construction; and
- Generation of sediment-rich or contaminated runoff from disturbed areas.

Such degradation is expected to result in the lowering of PES categories by at least one unit in affected areas if mitigation is not strictly applied.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-11).

Table 7-11: Significance of watercourse degradation

Project phase	Construction	
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts
Possible Mitigation	• Adhere to the aquatic ecology sensitivity No-Go areas when considering the placement of any infrastructure; • Avoid areas of <i>High</i> aquatic ecology sensitivity where possible; • Minimise disturbance areas; • Use existing roads as far as possible; • Compile, with input from an aquatic ecologist, and implement a stormwater management plan; • Inspect runoff from construction areas following rainfall events and implement corrective measures as required; • Address erosion gullies that are created in consultation with an aquatic ecologist; • Prohibit excavation, infilling; or any activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing³⁸, other than with written sign off from the ECO and aquatic ecologist; • Compile method statements for off-road underground cable trenching through watercourses and get sign off of these method statements from an aquatic ecologist; • Use manual labour for off-road underground cable trenching through watercourses, other than with written sign off from the ECO and aquatic ecologist; • Immediately follow trench excavation with cable laying, trench infill and rehabilitation activities; • Physically demarcate 20 m wide access road disturbance zones in watercourses and their buffers with temporary fencing, danger tape or other devices that will not interfere with flows or themselves cause further damage; • Fence construction areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the construction disturbance footprint lies closer than 20 m from any watercourse to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself; • Fence the outer edge of buffer areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the construction disturbance footprint lies closer than 50 m from any watercourse buffer to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself; • Remove alien and weedy plants from all watercourses and their buffers in the areas that are disturbed during construction activities;	

³⁸ Note that construction above watercourse level (e.g. construction of the road above the culverts) may take place in the wet season/when the watercourse is flowing.

	- Rehabilitate aquatic ecosystems and buffer areas that are disturbed during construction, with the objective of returning them to their pre-construction condition or better; and - Comply with the EMPs for the project.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Short term	impact will last between 1 and 5 years
Extent	Regional	Impacts felt at a regional/provincial level	Municipal area	Impacts felt at a municipal level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impacts of the cluster would be medium without mitigation and low with mitigation. With inclusion of the improvement of at least one aspect of watercourse condition at each watercourse crossing upgrade, the combined impact would be very low positive.			

7.7.3 Assessment of Potential Impacts: Operational Phase

The following potential direct **Operational Phase** impact on Aquatic Ecology was identified:

- AE3: Watercourse degradation.

7.7.3.1 Potential Impact AE3: Watercourse Degradation

Watercourse channels could be incised if watercourse crossing design and Construction Phase mitigation measures are not fully implemented or prove insufficient/inadequate to manage actual conditions. Furthermore, increased peak volume and velocities of runoff from locally hardened areas could lead to increased erosion and sediment loads in watercourses. These aspects of wetland degradation would persist if left unmanaged. Deterioration would either be incremental or episodic (i.e. following major storm events).

This impact is exacerbated by the predicted increase in rainfall and extreme rainfall days in the region from climate change (Promethium Carbon, 2024), increasing the importance of effective stormwater management at the project site.

Periodic infrastructure maintenance or repair measures, if inappropriately implemented, would also aggravate wetland degradation.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-12).

Table 7-12: Significance of watercourse degradation

Project phase	Operations			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	• Compile and implement stormwater management plan; • Inspect watercourses proximate to project infrastructure on a regular basis and repair erosion gullies that are caused by runoff from project infrastructure with the input of an aquatic ecologist; • Address channel incision at new or upgraded watercourse crossings with the input of an aquatic ecologist; • Prohibit activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing, other than with written sign off from an aquatic ecologist; • Rehabilitate aquatic ecosystems and buffer areas that are disturbed during maintenance; • Use existing roads as far as possible for maintenance activities; • Clear invasive alien plants from watercourses and their buffers within the project footprint on an ongoing basis; and • Update the Operational Phase EMP at the conclusion of the Construction Phase when the post-construction condition of the site and its watercourses and any construction or design-related modifications or impacts are clearly understood and can be addressed with input from an aquatic ecologist.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	On-going	Impact will last between 15 and 20 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impacts of the cluster would be medium without mitigation and low with mitigation. With inclusion of the improvement of at least one aspect of watercourse condition at each watercourse crossing upgrade, the combined impact would be very low positive.			

7.7.4 Assessment of Potential Impacts: Decommissioning Phase

The following potential direct Decommissioning Phase impact on aquatic ecology was identified:

- AE4: Watercourse degradation.

7.7.4.1 Potential Impact AE4: Watercourse Degradation

Decommissioning will entail the removal of all infrastructure installed on the site, with the exception of access roads and associated stormwater management systems. The passage of heavy vehicles across wetland crossings could result watercourse degradation.

The cessation of watercourse management activities undertaken by the proponent throughout the life of the project may mean that watercourse degradation as is currently occurring, may resume.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-13).

Table 7-13: Significance of watercourse degradation

Project phase	Decommissioning			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	• Compile a Decommissioning Phase EMPr prior to the conclusion of the Operational Phase • Get sign off of the Decommissioning Phase EMPr from an aquatic ecologist and/or restoration specialist; • Remove and legally discard infrastructure that ceases to operate as per its intended design at the end of the Operational Phase within one year of the cessation of operations (including access roads that would not continue to be used by landowners and off-road underground cables where their removal is not assessed to result in more watercourse degradation by its removal than by being left in situ with no maintenance); • Address disturbance caused at watercourse crossings and off-road underground cables during removal (for example, by installing infrastructure such as gabion weirs to prevent head-cut erosion) with the input of an aquatic ecologist; • Remove and rehabilitate all hard surfacing (parking, building platforms, turbine stands etc.) to allow for the establishment of non-invasive vegetation in these areas; • Maintain rehabilitated areas for at least one year following the completion of the Decommissioning Phase • Prohibit excavation, infilling; or any activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing, other than with written sign off from the ECO and aquatic ecologist; • Fence work areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the disturbance footprint lies closer than 20 m from any watercourse to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself; • Fence the outer edge of buffer areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the disturbance footprint lies closer than 50 m from any watercourse buffer to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself; and • Minimise disturbance area.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur

Confidence	Low	Judgement is based on intuition	Low	Judgement is based on intuition
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impacts of the cluster would be medium without mitigation and low with mitigation. With inclusion of the improvement of at least one aspect of watercourse condition at each watercourse crossing upgrade, the combined impact would be very low positive.			

7.7.5 Mitigation Measures: Potential Aquatic Ecology Impacts

Essential mitigation measures during the **Construction Phase** are as follows:

- Adhere to the aquatic ecology sensitivity No-Go areas when considering the placement of any infrastructure;
- Avoid areas of *High* aquatic ecology sensitivity where possible;
- Minimise disturbance areas;
- Use existing roads as far as possible;
- Allow for improvement in at least one aspect of watercourse condition at each watercourse crossing where any road upgrade is required, determined on a site-by-site basis in consultation with an aquatic ecologist during the development of detailed road design for each crossing;
- Micro-site all new road crossings in consultation with an aquatic ecologist; hydrologist and roads engineer;
- Design roads through seeps and source seeps to manage through-flows without causing erosion or wetland shrinkage;
- Compile, with input from an aquatic ecologist, and implement a stormwater management plan;
- Inspect runoff from construction areas following rainfall events and implement corrective measures as required;
- Address erosion gullies that are created in consultation with an aquatic ecologist;
- Prohibit excavation, infilling; or any activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing³⁹, other than with written sign off from the ECO and aquatic ecologist;
- Compile method statements for off-road underground cable trenching through watercourses and get sign off of these method statements from an aquatic ecologist;
- Use manual labour for off-road underground cable trenching through watercourses, other than with written sign off from the ECO and aquatic ecologist;

³⁹ Note that construction above watercourse level (e.g. construction of the road above the culverts) may take place in the wet season/when the watercourse is flowing.

- Immediately follow trench excavation with cable laying, trench infill and rehabilitation activities;
- Physically demarcate 20m wide access road disturbance zones in watercourses and their buffers with temporary fencing, danger tape or other devices that will not interfere with flows or themselves cause further damage;
- Fence construction areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the construction disturbance footprint lies closer than 20 m from any watercourse to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself;
- Fence the outer edge of buffer areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the construction disturbance footprint lies closer than 50 m from any watercourse buffer to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself;
- Remove alien and weedy plants from all watercourses and their buffers in the areas that are disturbed during construction activities; and
- Rehabilitate aquatic ecosystems and buffer areas that are disturbed during construction, with the objective of returning them to their pre-construction condition or better.

Essential mitigation measures during the **Operational Phase** are as follows:

- Compile and implement stormwater management plan;
- Inspect watercourses proximate to project infrastructure on a regular basis and repair erosion gullies that are caused by runoff from project infrastructure with the input of an aquatic ecologist;
- Address channel incision at new or upgraded watercourse crossings with the input of an aquatic ecologist;
- Prohibit activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing, other than with written sign off from an aquatic ecologist;
- Rehabilitate aquatic ecosystems and buffer areas that are disturbed during maintenance;
- Use existing roads as far as possible for maintenance activities;
- Clear invasive alien plants from watercourses and their buffers within the project footprint on an ongoing basis; and
- Update the Operational Phase EMP at the conclusion of the Construction Phase when the post-construction condition of the site and its watercourses and any construction or design-related modifications or impacts are clearly understood and can be addressed, with input from an aquatic ecologist.

Essential mitigation measures during the **Decommissioning Phase** are as follows:

- Compile a Decommissioning Phase EMP prior to the conclusion of the Operational Phase
- Get sign off of the Decommissioning Phase EMP from an aquatic ecologist and/or restoration specialist;
- Remove and legally discard infrastructure that ceases to operate as per its intended design at the end of the Operational Phase within one year of the cessation of operations (including access roads that would not continue to be used by landowners and off-road underground cables where

their removal is not assessed to result in more watercourse degradation by its removal than by being left in situ with no maintenance);

- Address disturbance caused at watercourse crossings and off-road underground cables during removal (for example, by installing infrastructure such as gabion weirs to prevent headcut erosion) with the input of an aquatic ecologist;
- Remove and rehabilitate all hard surfacing (parking, building platforms, turbine stands etc) to allow for the establishment of non-invasive vegetation in these areas;
- Maintain rehabilitated areas for at least one year following the completion of the Decommissioning Phase;
- Prohibit excavation, infilling; or any activities that require vehicle movement or personnel within watercourses or their buffer areas when the watercourse is saturated to flowing, other than with written sign off from the ECO and aquatic ecologist;
- Fence work areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the disturbance footprint lies closer than 20 m from any watercourse to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself;
- Fence the outer edge of buffer areas with temporary fencing (e.g. wire netting, but not danger tape) where the outside edge of the disturbance footprint lies closer than 50 m from any watercourse buffer to prevent the passage of vehicles, heavy machinery and construction personnel into the remaining buffer area and/or watercourse itself; and
- Minimise disturbance areas.

7.7.6 No-Go Alternative

The No-Go alternative maintains the current status quo of the site. Watercourses on site are subject to significant ongoing watercourse erosion, affecting numerous valley bottom wetlands in particular, and separating these from their slowly degrading wetland flats and floodplain wetlands. Since the project site is owned and managed by multiple landowners, including provincial and local authorities (roads and road reserves), there is no cohesive management plan for watercourse rehabilitation or maintenance, and little consideration of aquatic ecology in both formal and informal watercourse crossing design.

The No-Go alternative will therefore result in the ongoing deterioration of watercourse condition, with episodic events that result in large-scale watercourse erosion and wetland loss. Nevertheless, intact watercourses (mainly seeps and some wetland flats) remain in the landscape and are important remnants of Critically Endangered wetlands in a rapidly degrading area.

With the implementation of design measures to improve the spread, speed or alignment of flows under road crossings at all upgraded or new watercourse crossings, the proposed development is a preferred outcome to the No-Go alternative, from an aquatic ecosystems perspective.

7.7.7 Cumulative Impacts

Apart from the Renoster cluster, there are no known major commercial or industrial developments either proposed or existing within 30km of the site, and the main existing ecological stressor in the region is the conversion and on-going utilisation of land for agricultural purposes.

The cumulative impact of large-scale development on an extensive area of Critically Endangered watercourse types means that the significance of any impacts on these systems would be magnified,

because the remaining systems in a natural or good condition, or even in a sustainable condition, are rapidly dwindling.

The cumulative impacts of the proposed cluster with ongoing stresses on the aquatic ecosystems at the site are considered of **low** significance with mitigation. With the implementation of design measures to improve the spread, speed or alignment of flows under road crossings at all upgraded or new watercourse crossings the cluster the cumulative impact significance would decrease to **very low** or even be positive.

7.7.8 Impact Statement

Site assessments show that many watercourses in the broader project area have been impacted by high levels of erosion, affecting seeps and valley bottom wetlands in particular. Much of this erosion is triggered by poorly designed road crossings, resulting in watercourse narrowing and diversion and concentration of flows into downstream wetland channels. Valley bottom wetlands and their wetland flats that have not been eroded and remain in a good condition are considered of extremely high importance.

The proposed development will extend over large areas, including areas supporting relatively undisturbed watercourses. Although the current development layout has effectively avoided most watercourses, it will nevertheless require new road crossing and the expansion of existing road crossings over multiple watercourses. Many of the watercourses are already in state of degradation due to existing structures, and some new roads will pass through currently least-affected areas.

Avoidance, management and mitigation measures to address the identified impacts of wetland loss and degradation are however available, and with their full implementation, the overall significance of the proposed development for aquatic ecosystems would be of **low** significance, with the potential for positive impacts at many watercourse crossings that would offset residual negative impacts. Authorisation of the proposed project would therefore be considered acceptable, and in fact beneficial in some areas from an aquatic ecosystem perspective (Day, 2024).

7.7.9 Recommendations for the Impact Assessment Phase

The Final Aquatic Ecology Specialist Assessment will consider and assess the revised WEF layout.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database.

7.8 Potential Terrestrial Ecology Impacts

7.8.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Terrestrial Ecology Specialist Assessment, Plant Species Compliance Statement and Animal Species Specialist Assessment undertaken by 3Foxes Biodiversity Solutions (see Appendix H4 – H6). The purpose of the studies was to assess the potential impacts of the project on terrestrial ecology, including plant and animal species, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits.

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on the site, and place this in a regional context;

- Identify and assess each potential impact of the project and the alternatives, including impacts associated with the Construction and Operational Phases, followed by a narrative description of each impact and a presentation of the assessment;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area in the context of limits of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

A comprehensive desktop study was initially undertaken by consulting a wide range of literature and available mapping. Thereafter, six site visits were undertaken. The initial site visit included helicopter flights over the site to obtain a general overview of the site, especially the broad-scale ecological features and processes across the site, and informed sensitivity mapping. The second site visit also investigated the site as broadly as possible and ground-truthed the sensitivity mapping. Four field assessments to sample the site across all seasons were then undertaken. Four vegetation sample sites were surveyed.

Fauna sampling at the site included direct observation, active searching, small mammal trapping with live traps, camera trapping and species-directed surveys. Camera trapping with 20 cameras distributed across the greater Renoster cluster area was conducted. Cameras were located in a range of natural habitats and were in place for a minimum of eight weeks, but usually up to 12 weeks. Small mammal live-trapping was also conducted with 30 traps set for four nights.

The sensitivities of various habitat types present in the project area were classified according to the definitions in Table 7-14 and the required level of mitigation defined per category (Todd, 2024).

Table 7-14: Sensitivity category definitions and required mitigation strategies

Sensitivity	Description	Mitigation strategy
Very Low	Roads, farmsteads, quarries etc. that have been transformed from their natural state.	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.
Low	Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Medium	Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impacts such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
High	Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution. Where roads are required through these areas, existing access roads should preferably be used as	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.

Sensitivity	Description	Mitigation strategy
	this reduces both the impact and the footprint of any access roads.	
Very High/ No Go	Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas represent no-go areas from a developmental perspective and should be avoided.	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.

Source: (Todd, 2024)

The sensitivity of the main habitats in the Renoster 1 Wind Farm site are set out in Table 7-15. The limits of acceptable change i.e. to the estimated extent of on-site habitat loss that is considered acceptable before the integrity of the environment is compromised – are also provided for each sensitivity category, and the Site Ecological Importance (SEI⁴⁰) for fauna is presented (Todd, 2024), (Todd, 2024). The SEI for the Renoster 1 Wind Farm site is mapped and overlaid with the preliminary layout in Figure 7-1.

Table 7-15: Sensitivity of the habitats of the Renoster 1 Wind Farm site

Habitat Type	Description	Sensitivity	Limit of Acceptable Change (% cover)	Fauna SEI
Croplands	Areas currently or recently used for crop production.	Low	5	Very Low
Transformed areas	Roads, farmsteads, quarries etc. that have been transformed from their natural state.	Low		Very Low
Degraded Grassland	Degraded areas and fallow farmlands, which have naturally recovered a vegetation cover dominated by indigenous species.	Low		Low
Intact Grassland	Vegetation types which are not threatened.	Medium	2	Low
Intact Grassland	Vegetation types that are threatened.	High	1	Low
Intact <i>T. triandra</i> grassland	Habitat for Sensitive Species 15.	Very High	0.1	High
Pans	Natural depressions and pan features.	Very High		Medium
Wetlands & Drainage Features	Drainage features with associated wetlands.	Very High		Low
Ridges and Rocky Outcrops	Unusual features supporting a community structure distinct from the surrounding grassland.	Very High		
Rock Pavements	Localized features providing unique habitat.	Very High		

Source: (Todd, 2024),

⁴⁰ SEI is a standardised metric developed to determine the ecological importance of habitats within a specific footprint or project area of influence (PAOI). It is a function of the biodiversity importance (BI) of the receptor (BI in turn is a function of conservation importance and the functional integrity of the receptor e.g. SCC, community or habitat type present on the site) and the resilience of the receptor to impacts.

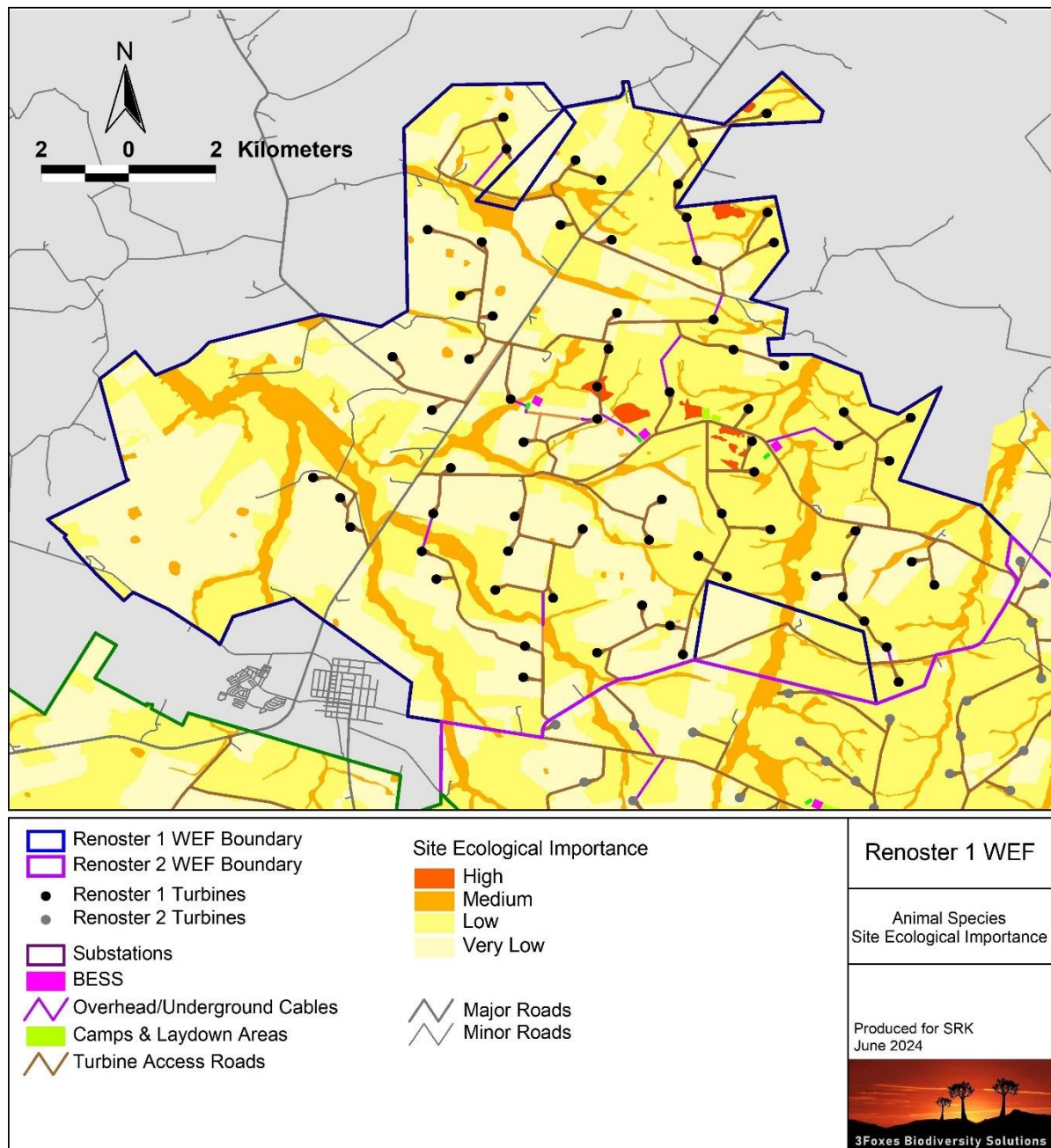


Figure 7-1: Site ecological importance of the Renoster 1 site and preliminary layout

Source: (Todd, 2024),

7.8.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** impacts on Terrestrial Ecology were identified:

- TE1: Disturbance and habitat loss in ESAs;
- TE2: Degradation of NFEPA priority sub-catchments; and
- TE3: Displacement and mortality of faunal SCC.

7.8.2.1 Potential Impact TE1: Disturbance and Habitat Loss in ESAs

Just over half the Renoster 1 Wind Farm site has been transformed for agriculture and is considered Low sensitivity, presenting few ecological constraints to development. The majority of the remaining

intact vegetation on the site comprises Central Free State Grassland, classified as *Least Concern* and of *Medium* sensitivity, and development in these areas is expected to have minimal impacts on terrestrial ecology. *Endangered* Vaal-Vet Sandy Grassland is present in the west of the site and has been taken into account (avoided) in the layout planning and will not be affected by the proposed project.

Approximately 42.55 of 3 167.71 ha (1.34%) and 41.29 of 2 718 ha (1.52%) of the proposed footprint falls within ESA 1 and ESA 2 areas, respectively. These areas have been mapped as *Medium* sensitivity. Habitat fragmentation in these ESAs could affect broad-scale ecological processes in the area. However, ground-truthing has shown that extensive parts of the mapped ESA areas are transformed, so while construction activities may result in some habitat loss and loss of connectivity within the affected ESAs, this impact is likely to be local in nature and unlikely to further impact the functioning of the ESAs. The extent of the potential habitat loss within the ESAs falls within the 2% level of acceptable change proposed for *Medium* sensitivity areas.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-16).

Table 7-16: Significance of disturbance and habitat loss

Project phase	Construction			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	- Relocate or remove turbines and access roads outside of the mapped <i>High</i> SEI areas; - Conduct a preconstruction walk-through of the final development footprint within mapped ESAs, with micro-siting (by suitably qualified ecological specialists) of turbines and any access roads, internal cables and overhead lines traversing drainage lines and riparian areas; - Minimise the development footprint as far as possible and locate temporary-use areas such as construction camps and lay-down areas in low sensitivity/previously disturbed areas; and - Rehabilitate all disturbed areas as quickly as possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low – negative		Low - negative	

Comment on combined Renoster cluster	Combined impacts on ESAs are likely to be low because layouts avoided important biodiversity features.

7.8.2.2 Potential Impact TE2: Impact on NFEPA Priority Sub-Catchments

The eastern part of the development footprint lies within NFEPA priority sub-catchments associated with the Renoster River which is a tributary of the Vaal River. The development would potentially impact the affected sub-catchments: any disturbance and soil erosion could affect water quality and quantity (flow), and consequently the delivery of ecosystem services and ecosystem integrity within the site and downstream may be affected. Providing that mitigation is applied as recommended, the development is considered compatible with the goals of the FEPA priority sub-catchment.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-17).

Table 7-17: Significance of impacts on NFEPA priority sub-catchments

Project phase	Construction			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	- Minimise disturbance within or near drainage lines; - Rehabilitate all disturbed areas as quickly as possible; and - Implement an erosion monitoring programme for a minimum of three years post-construction and ensure that appropriate revegetation and erosion control works are effected to rectify any identified damage.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	Development in proximity to drainage features is minimal and mitigation to avoid and reduce erosion and other negative impacts is likely to be effective, thereby reducing the overall impact of the Wind Farm cluster and grid connection on FEPA sub-catchments to low significance.			

7.8.2.3 Potential Impact TE3: Displacement and Mortalities of Faunal SCC

During construction, the increased levels of traffic, noise, dust and human activity may have direct and indirect impacts on fauna SCC, including displacement, and mortalities from vehicle collisions. The high number of personnel present as well as increased site access would also potentially increase poaching risk for fauna. Furthermore, construction activities could result in habitat loss and degradation causing displacement of faunal species.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-18).

Table 7-18: Significance of impacts on faunal SCC

Project phase	Construction			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	- Relocate or remove Turbines T25 and T33 outside of the mapped <i>High</i> sensitivity areas; - Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads; - Prohibit service staff leaving the designated construction footprint and access routes; - Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; - Ensure that holes and trenches are closed as quickly as possible; - Construct soil ramps that allow fauna to escape in all holes and trenches and check these at a minimum every second day at a minimum for fauna that may have fallen in; - Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed by the ECO; and - Conduct a preconstruction walk-through of the final development footprint within intact areas, with micro-siting of turbines and roads to avoid sensitive habitat features, burrows, bush clumps and other features of high faunal SEI.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between 5 and 10 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	

Comment on combined Renoster cluster	Construction of several wind farms and a grid connection in the area would increase fragmentation and habitat degradation in the affected area. Sensitive Species 15 would be particularly vulnerable to any additional habitat fragmentation as this species exhibits a high fidelity for their burrows and does not readily disperse. With avoidance of High SEI areas and turbine micro-siting, impacts from habitat fragmentation and degradation resulting from all three Renoster WEFs are likely to be of low significance.

7.8.3 Assessment of Potential Impacts: Operational Phase

The following potential direct **Operational Phase** impacts on terrestrial ecology were identified:

- TE4: Disturbance within ESAs;
- TE5: Reduction in ecosystem services in NFEPA priority sub-catchments;
- TE6: Degradation of NPAES Focus Areas; and
- TE7: Disturbance and mortality of fauna SCC.

7.8.3.1 Potential Impact TE4: Disturbance within ESAs

The WEF will result in some long-term disturbance of fauna in ESAs mainly as a result of noise, traffic and human activity. The impact is assessed to be of **low** significance with and without mitigation (Table 7-19).

Table 7-19: Significance of disturbance within ESAs

Project phase	Operational			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	• Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads; • Prohibit service staff leaving the designated WEF footprint and access routes; • Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; and • Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed annually by the ECO and used to inform operational management and mitigation measures.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Low - negative	

Comment on combined Renoster cluster	Combined impacts on ESAs are likely to be low as a result of the sensitivity mapping of important biodiversity features that has taken place and the avoidance of such features under the layouts as assessed.

7.8.3.2 Potential Impact TE5: Reduction of Ecosystem Services in FEPA Priority Sub-Catchments

The presence and operation of the WEF may result in some long-term impacts on ecosystem services within FEPA priority sub-catchments. Erosion is likely to develop in disturbed areas that are not appropriately revegetated and ecosystems are more susceptible to the spread of alien plant species when disturbed. Water quality and/or quantity through the sub-catchments could be affected by erosion or the spread of alien vegetation. These potential impacts can be managed through the effective implementation of the Operational Phase EMPr.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-20).

Table 7-20: Significance of impacts on FEPA priority sub-catchments

Project phase	Operational			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	- Develop and implement an Erosion Management Plan to ensure that any erosion resulting from the project is rectified as soon as possible, using the appropriate erosion control structures and revegetation practices; - Follow up to ensure that rehabilitation and revegetation of any bare areas with indigenous perennial shrubs, grasses and trees is effective; and - Develop and implement an Invasive Species Management Plan for the Operational Phase. Undertake at least annual monitoring implement appropriate remedial measures if invasive species are detected, using the appropriate best-practice alien control techniques for the species present.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Low - negative	

Comment on combined Renoster cluster	With mitigation, overall impacts on FEPA sub-catchments resulting from all three Renoster WEFs are likely to be low and not of broader significance.

7.8.3.3 Potential Impact TE6: Degradation of NPAES Focus Areas

In the preliminary layout, fifteen turbines are located within the NPAES Focus Areas located in the eastern portion of the site and two turbines in the NPAES Focus Area in the south west of the site (Figure 6-20). The total footprint within the NPAES Focus areas is 41 ha and most of this direct footprint is restricted to one these areas, which would lose approximately 1.2% of its total area. However, and while noting that wind energy developments do not necessarily preclude certain forms of formal landscape protection, impacts on NPAES Focus areas must be considered at a broader scale as the presence of wind turbines could reduce the overall value of the affected NPAES Focus areas for future conservation.

The affected NPAES Focus areas are all located within the Central Free State Grassland vegetation type, which has an estimated extent of 15 982 km² of which 567 172 ha (5 671 km²) is designated as NPAES Focus areas. As a worst-case scenario, if the full loss of the most affected NPAES Focus area is assumed, a loss of 0.59% of the Central Free State Grassland represented within NPAES Focus areas will occur. Given the isolation of the most affected NPAES Focus area, the distance of the affected area from existing formal conservation areas, and the relative dearth of unique ecological features at the site it is unlikely that the loss of the affected NPAES Focus Area will meaningfully reduce future conservation expansion options within the Central Free State Grassland vegetation type. This is further supported by the fact that Central Free State Grassland is still approximately 75% intact, and as such alternative options to meet conservation targets for this vegetation type are available. The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-21).

Table 7-21: Significance of degradation of NPAES focus areas

Project phase	Operational			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible mitigation	- Minimise the development footprint as far as possible, including locating temporary-use areas in areas of low sensitivity or previously disturbed areas. - Avoid impacts on restricted and specialised habitats such as pans, wetlands and rock pavements.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Regional	Impacts felt at a regional/provincial level	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of all the Renoster WEFs and grid connection will result in the loss of approximately 4% of the area of Central Free State Grassland that is currently captured within the NPAES Focus Areas network. Some forms of conservation are considered compatible with WEFs, so these areas may not be entirely lost to conservation. With mitigation, the combined impact remains of low significance.			

7.8.3.4 Potential Impact TE7: Disturbance and Mortality of Fauna SCC

During operation, occasional anthropogenic disturbance associated with maintenance activities may have an impact on fauna SSCC. Some species may also be at increased risk of poaching. Any internal overhead power lines within the facility could increase the abundance of corvids and raptors within the site, resulting in increased predation of (sensitive) reptiles.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-22).

Table 7-22: Significance of disturbance and mortality of fauna SCC

Project phase	Operational			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	• Ensure no additional disturbance occurs in areas mapped as being of high SEI for fauna. • Remove corvid and non-SCC raptor nests (in consultation with an avifaunal specialist) identified during annual surveys along any internal overhead lines within the site and located within 1 km of suitable Sensitive Species 15 habitat. • Prohibit service staff leaving the designated WEF footprint and access routes; • Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; and • Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed annually by the ECO and used to inform operational management and mitigation measures.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the	Medium	The affected environment will only recover from the impact with significant intervention

		impact with significant intervention		
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	During operations, the major potential risks associated with the presence and operation of the wind farm cluster would be increased disturbance, site access and the associated increased poaching risk. While little can be done to limit the impacts of turbine noise, these impacts are local in nature and unlikely to have a significant cumulative impact at the landscape scale. The risks of poaching can be effectively managed through access control and site monitoring. With mitigation, the combined impact remains of low significance.			

7.8.4 Assessment of Potential Impacts: Decommissioning Phase

The following potential **Decommissioning Phase** impacts on terrestrial ecology were identified:

- TE9: Loss of ecological integrity of ecosystems; and
- TE10: Disturbance and mortality of faunal SCC.

7.8.4.1 Potential Impact TE9: Loss of Ecological Integrity of Ecosystems

During decommissioning, removal of infrastructure will result in exposure of disturbed areas, which will be susceptible to erosion and the spread of invasive plants. During decommissioning, increased traffic, noise, dust and human activity will also affect the ecological integrity of the area. However, if the site is rapidly and effectively rehabilitated, a high level of restoration of ecological functioning and value will be restored. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-23).

Table 7-23: Significance of impacts of decommissioning on ecological integrity

Project phase	Decommissioning			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	• Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads. • Prohibit service staff leaving the designated WEF footprint and access routes; • Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; • Continue to implement the Erosion Management Plan to ensure that any erosion resulting from the project is rectified as soon as possible, using the appropriate erosion control structures and revegetation practices; • Follow up to ensure that rehabilitation and revegetation of any bare areas with indigenous perennial shrubs, grasses and trees is effective; and • Continue to implement the Invasive Species Management Plan for the duration of the Decommissioning Phase and for at least three years after decommissioning. Undertake at least annual monitoring implement appropriate remedial measures if invasive species are detected, using the appropriate best-practice alien control techniques for the species present.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between 5 and 10 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The presence of multiple wind farms and grid connections in the area and their subsequent decommissioning would at least partially return to the area to its former state in terms of development. While this poses some risk in terms of degradation, ultimately, with mitigation, there are unlikely to be any long-term impacts associated with the decommissioning of the site. With mitigation, the combined impact remains of very low significance.			

7.8.4.2 Potential Impact TE10: Disturbance and Mortality of Faunal SCC

During decommissioning, increased levels of traffic, noise and disturbance may have a direct and indirect impact on sensitive fauna species. Furthermore, decommissioning activities could result in some habitat loss and degradation within areas of suitable habitat if these are disturbed or degraded. The high number of personnel present as well as increased site access would potentially increase poaching risk for fauna. However, this impact would be relatively short term in nature and if appropriately rehabilitated, the site would be returned to a near-natural condition.

The impact is assessed as being of **low** significance with and without mitigation (Table 7-23).

Table 7-24: Significance of impacts of faunal SCC

Project phase	Decommissioning			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads. • Prohibit service staff leaving the designated WEF footprint and access routes; • Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; • Ensure that holes and trenches are not left open for extended periods and that soil ramps that allow fauna to escape. Holes should also be checked regularly (every second day at least) for fauna that may have fallen in; and • Rehabilitate all disturbed areas in accordance with a site rehabilitation plan.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short-term	impact will last between 1 and 5 years	Short-term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	Should all wind farms of the cluster be decommissioned at the same time, there would be a lot of activity at the site, which may increase disturbance and poaching risks. However, in the long-term, decommissioning would return the site to a near-natural state and reduce long-term disturbance. Therefore, the combined impact remains of low significance.			

7.8.5 Mitigation Measures: Potential Terrestrial Biodiversity Impacts

Essential mitigation measures during **construction** are as follows:

- Relocate or remove turbines and access roads, specifically Turbines T25 and T33, outside of the mapped High SEI areas;
- Minimise the development footprint as far as possible, including locating temporary-use areas such as construction camps and lay-down areas in areas of low sensitivity or previously disturbed areas;
- Avoid impacts on restricted and specialised habitats such as pans, wetlands and rock pavements;
- Conduct a preconstruction walk-through of the final development footprint in mapped ESAs, with micro-siting (by suitably qualified ecological specialists) of turbines and any access roads, internal cables and overhead lines traversing drainage lines and riparian areas;
- Conduct a preconstruction walk-through of the final development footprint within intact areas, with micro-siting (by suitably qualified ecological specialists) of turbines and roads to avoid sensitive habitat features, burrows, bush clumps and other features of high faunal SEI;
- Minimise the development footprint as far as possible and locate temporary-use areas such as construction camps and lay-down areas in low sensitivity/previously disturbed areas;
- Minimise disturbance within or near drainage lines;
- Rehabilitate all disturbed areas as quickly as possible;
- Implement an erosion monitoring programme for a minimum of three years post-construction and ensure that appropriate revegetation and erosion control works are effected to rectify any identified damage;
- Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads;
- Prohibit service staff from leaving the construction footprint areas and access routes and entering veld or farmland;

- Restrict site access and prohibit the disturbance or removal of fauna or flora from the site and its surroundings;
- Ensure that holes and trenches are closed as quickly as possible;
- Construct soil ramps that allow fauna to escape in all holes and trenches and check these at a minimum every second day at a minimum for fauna that may have fallen in; and
- Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed by the ECO.

Essential mitigation measures during **operations** are as follows:

- Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads;
- Prohibit service staff leaving the designated WEF footprint and access routes;
- Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings;
- Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed annually by the ECO and used to inform operational management and mitigation measures;
- Develop and implement an Erosion Management Plan to ensure that any erosion resulting from the project is rectified as soon as possible, using the appropriate erosion control structures and revegetation practices;
- Follow up to ensure that rehabilitation and revegetation of any bare areas with indigenous perennial shrubs, grasses and trees is effective;
- Develop and implement an Invasive Species Management Plan for the Operational Phase. Undertake at least annual monitoring implement appropriate remedial measures if invasive species are detected, using the appropriate best-practice alien control techniques for the species present;
- Ensure no additional disturbance occurs in areas mapped as being of high SEI for fauna;
- Remove corvid and non-SCC raptor nests (in consultation with an avifaunal specialist) identified during annual surveys along any internal overhead lines within the site and located within 1 km of suitable Sensitive Species 15 habitat; and
- Maintain a log of any fauna encountered on site, including chance finds, electrocutions, etc, to be reviewed annually by the ECO and used to inform operational management and mitigation measures.

Essential mitigation measures during **decommissioning** are as follows:

- Restrict heavy vehicles to 30km/h and light vehicles to 40km/h on all service roads;
- Prohibit service staff leaving the designated WEF footprint and access routes;
- Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings;
- Continue to implement the Erosion Management Plan to ensure that any erosion resulting from the project is rectified as soon as possible, using the appropriate erosion control structures and revegetation practices;

- Follow up to ensure that rehabilitation and revegetation of any bare areas with indigenous perennial shrubs, grasses and trees is effective; and
- Continue to implement the Invasive Species Management Plan for the duration of the Decommissioning Phase and for at least three years after decommissioning. Undertake at least annual monitoring implement appropriate remedial measures if invasive species are detected, using the appropriate best-practice alien control techniques for the species present.

7.8.6 The No-Go Alternative

The project area is currently mainly used for mixed cropping and extensive livestock grazing, which would be expected to continue if the project does not proceed. Livestock grazing is often compatible with long-term biodiversity maintenance, but over time, extensive grazing may result in changes in composition towards less palatable species and a reduction in plant cover. Fauna species are often negatively affected by farming: many predators are targeted due to their impact on livestock, while some species are vulnerable to habitat loss or degradation and populations may be reduced within the farming landscape.

However, the proposed project does not represent an alternative to farming, which can continue in conjunction with the WEF, but rather an additional impact on the current land use. Overall, the No-Go alternative is expected to result in a **low** impact on terrestrial biodiversity.

7.8.7 Potential Cumulative Impacts

Exceeding the limits of acceptable change for *Endangered* Vaal-Vet Sandy Grassland would be considered a fatal flaw. However, the preliminary layout for the Renoster 1 Wind Farm entirely avoids all extant areas of this vegetation type, with the result it will not contribute to a cumulative impact on Vaal-Vet Sandy Grassland. The project will contribute to habitat loss within intact areas of Central Free State Grassland and an increase in habitat loss and fragmentation in the broader area. However, the contribution of the Renoster 1 Wind Farm to loss of intact Central Free State Grassland amounts to 72 ha, which is considered very minor relative to its overall national extent.

The development would contribute to cumulative impacts on fauna SCC due to habitat loss and habitat degradation. The contribution of the Renoster 1 Wind Farm to cumulative fauna SCC habitat loss is low as the sensitive areas are largely avoided in the preliminary layout. The presence of several wind farms may however collectively increase general habitat loss, degradation and fragmentation.

7.8.8 Impact Statement

Most of the site comprises of areas of Low and Medium sensitivity and the development footprint is well within the limits of acceptable change set for these sensitivity categories.

The identification, mapping and avoidance of areas of *High* and *Very High* sensitivity in the preliminary layout has minimised the impacts of the project these areas. However, two turbines (T24, T33) are located in High sensitivity areas confirmed as suitable habitat for Sensitive Species 15. These should be relocated outside of the mapped High sensitivity areas. The footprint within the High sensitivity areas is at the limit and is considered acceptable, with the relocation of the two turbines mentioned above. The impact on areas mapped as Very High sensitivity is also considered acceptable and as this only comprises a few roads which are required to traverse drainage features.

Based on the sensitivity mapping and limits of acceptable change, the development is considered acceptable in terms of its likely impact on observed biodiversity features within the site. No impacts that cannot be reduced to low significance after mitigation are expected. As such, from a terrestrial biodiversity perspective, there are no reasons not to authorise the development of the Renoster 1 Wind Farm.

The impact of the Renoster 1 Wind Farm Site on fauna SCC can be reduced to an acceptable low level with the implementation of appropriate mitigation and avoidance. Consequently, the development is considered acceptable for Animal Species with the implementation of the recommended avoidance mitigation and monitoring.

No plant SCC were expected or found to be present on the site. As such, from a Plant Species perspective there are no reasons to oppose the Renoster 1 Wind Farm.

7.8.9 Recommendations for the Impact Assessment Phase

The Final Terrestrial Ecology Specialist Assessment, Animal Species Specialist Assessment and Plant Species Compliance Statement will consider and assess the revised WEF layout, including the relocation of Turbines T24 and T33.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database and will assess the contribution of the Renoster 1 Wind Farm to the impact on NPAES Focus areas and loss of Central Free State Grassland.

7.9 Potential Avifauna Impacts

7.9.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Avifauna Specialist Assessment undertaken by AfriAvian (see Appendix H7). The purpose of the study was to assess the potential impacts of the project on priority bird species, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (Froneman & Loftie-Eaton, 2024).

The ToR for the study were to:

- Describe the affected environment from an avifaunal perspective;
- Discuss gaps in baseline data and other limitations and describe the expected impacts associated with the WEF and associated infrastructure;
- Identify potential sensitive environments that may be impacted on by the proposed facility;
- Determine the nature and extent of potential impacts based on the preliminary layout;
- Identify and assess the potential impacts of the proposed development on avifauna including cumulative impacts;
- Provide of sufficient mitigation measures to include in the EMPr, including 'No-Go' areas, where applicable;
- Compile a preliminary Avifauna Impact Assessment Report detailing the above, for inclusion in the Scoping Report; and
- Finalise the report for inclusion in the EIA Report.

Methods used to inform the assessment included the following:

- Review bird distribution data from SABAP2 for the 16 pentads⁴¹ in which the Renoster cluster is located (Figure 7-2);

⁴¹ A pentad grid cell covers 5 minutes of latitude by 5 minutes of longitude (5' × 5'). Each pentad is approximately 9 × 8 km in size.

- Determine priority species for wind developments and avifauna SCC occurring in the broader area;
- View project site at a landscape level using satellite imager to identify sensitive bird habitats;
- Predict habitat suitability for particular bird species within the project area using an ensemble model, focussing on breeding and foraging habitats;
- Conduct a site sensitivity screening and field survey setup visit to identify avifaunal habitats, potential nesting/roosting sites, and to map out locations of vantage points, focal points and transects for the monitoring surveys;
- Survey the cluster area by helicopter to understand habitats in and near the project site and to identify potential raptor nests (Figure 7-3);
- Monitor the site over four seasons, including drive surveys, walking surveys, vantage point and focal point surveys to understand bird diversity, abundance and flight patterns;
- Model flight risk, taking account of topographical features such as ruggedness, drainage, topographical relief and thermal uplift as well as vegetation productivity;
- Undertake a dedicated Secretarybird study to characterise potential breeding habitat areas and associated flight risk for the species; and
- Evaluate the SEI of the project site for avifauna.

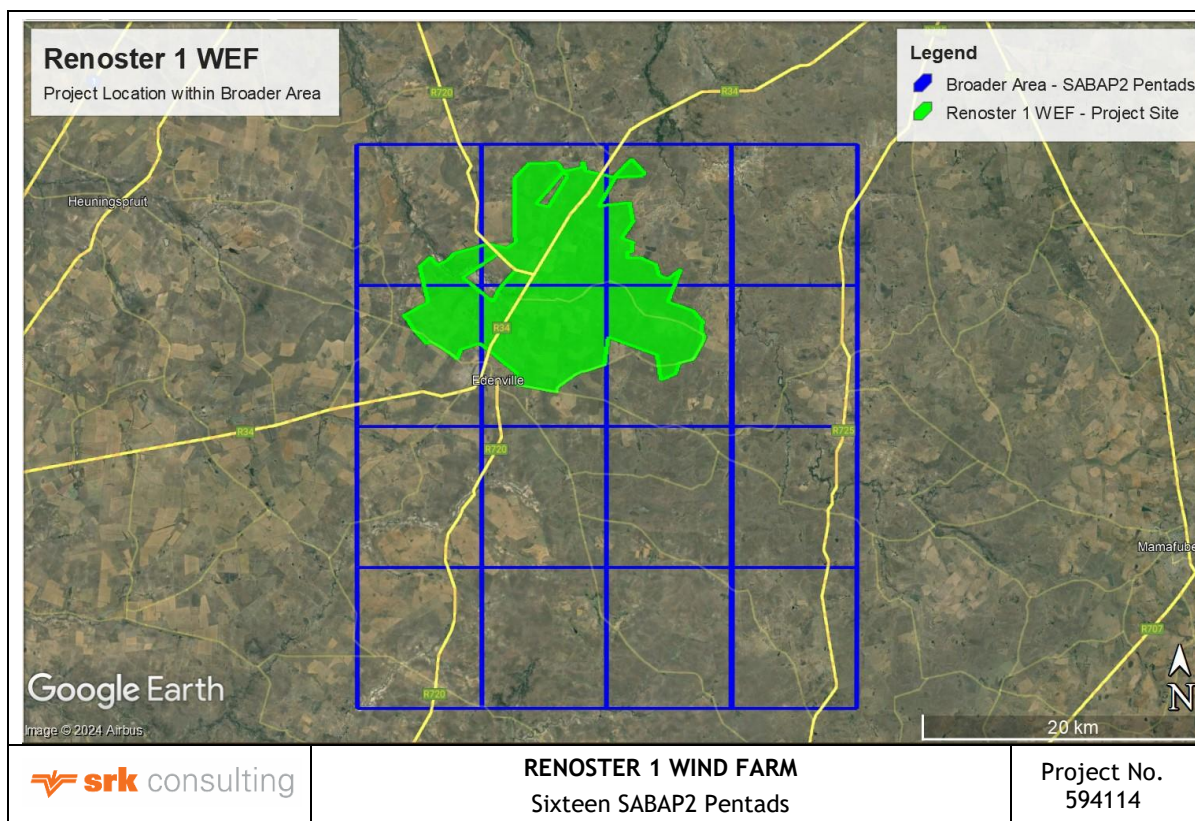


Figure 7-2: Location of Renoster 1 Wind Farm within the 16 SABAP2 pentads covering the cluster area

Source: (Froneman & Loftie-Eaton, 2024)

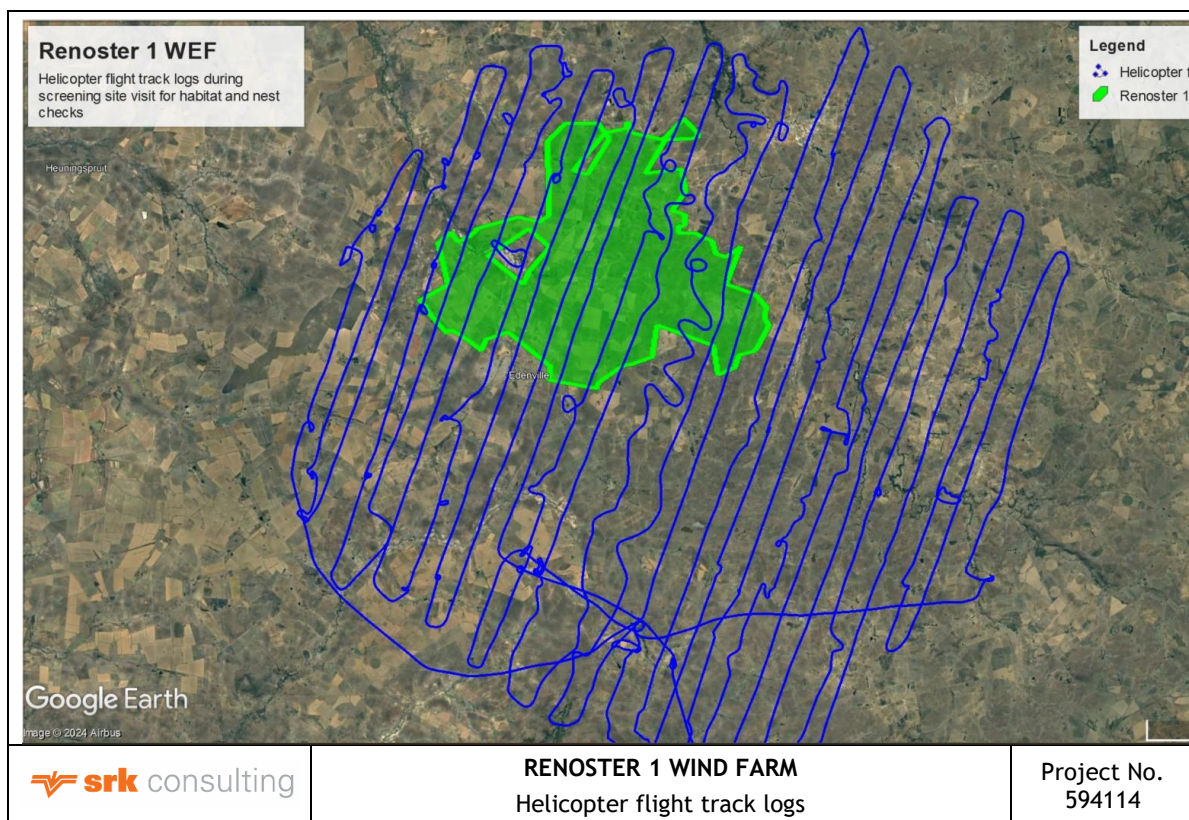


Figure 7-3: Helicopter flight track logs

Source: (Froneman & Loftie-Eaton, 2024)

7.9.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** impacts on avifauna were identified:

- AV1: Displacement of priority species due to habitat loss; and
- AV2: Displacement of priority species due to disturbance.

7.9.2.1 Potential Impact AV1: Displacement of Priority Species due to Habitat Loss

While Red Cap anticipates that the total physical footprint of the project will comprise <2% of the Renoster 1 project area, the effect may be more extensive as habitat may become less viable for certain species due to edge effects, habitat fragmentation and disturbance.

The construction and formalisation of the road network in the project area is likely to cause significant habitat fragmentation and may have an effect on the density of several priority species, particularly larger terrestrial species such as Ludwig's bustard, Blue crane, Blue korhaan, and Northern black korhaan. Priority species likely to be affected by habitat loss include: African grass owl, Blue crane, Blue korhaan, Northern black korhaan, Black-winged pratincole, Denham's bustard, Ludwig's bustard, Double-banded courser, Grey-winged francolin, Marsh owl, Spotted eagle owl, Melodious lark and Secretarybird.

In terms of the species assessment guidelines, the site was assessed as having a Medium SEI⁴² for avifauna. Minimisation and restoration mitigation measures are considered appropriate for these areas.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-31).

Table 7-25: Significance of displacement of priority species due to habitat loss

Project phase	Construction			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	- Limit clearance of vegetation and disturbance to an absolute minimum and adhere to a rehabilitation plan; - Restrict construction activity to the immediate footprint of the infrastructure, particularly with respect to the proposed road network; - Adhere to the recommended All Infrastructure Exclusion Zones, with the exception of roads and underground trenches which are deemed acceptable from an aquatic ecology perspective and overhead powerlines. - Ensure Secretarybird nests within the 500m all infrastructure exclusion zone are inactive prior to upgrading existing roads in these areas; - Prohibit service staff leaving the designated WEF footprint and access routes; - Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; and - Minimise the construction of new roads by utilising existing access roads wherever possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Medium - negative		Low - negative	

⁴² While the conservation importance of the site is considered High based on the confirmed presence and confirmed available habitat for a number of avifaunal SCC, the functional integrity of the site is Medium due to narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and an actively used road network between intact habitat patches, giving a Medium biodiversity importance. Combined with a Medium receptor resilience rating, the overall SEI is Medium.

Comment on combined Renoster cluster	The combined impact of habitat loss of the three Renoster WEFs and grid connection on avifauna will extend across the cluster and immediate environment. The combined impact of the three wind farms and the grid connection will remain low post mitigation.

7.9.2.2 Potential Impact AV2: Displacement of Priority Species due to Disturbance

It is inevitable that displacement will take place to some degree for all bird species during construction (and decommissioning), due to the disturbance (e.g. noise, traffic, dust, lighting etc.) associated with on-site activities. The consequences of displacement for breeding productivity and survival crucially determine whether there is likely to be a significant impact on population size. However, there is little data available in South Africa to accurately predict the effects on local avifauna. In the United Kingdom, monitoring data from wind farms were collated to test whether breeding densities of birds were reduced as a result of wind farm construction. *Lagopus lagopus scoticus* Red grouse, *Gallinago gallinago* Snipe and *Numenius arquata* Curlew breeding densities all declined on wind farms during construction. Red Grouse breeding densities recovered after construction, but Snipe and Curlew densities did not. Conversely, breeding densities of *Alauda arvensis* Skylark and *Saxicola torquata* Stonechat increased on wind farms during construction (Froneman & Loftie-Eaton, 2024).

Ground-nesting species will likely be particularly affected due to the disruption of their reproductive cycles. For large terrestrial species, site fidelity and species longevity may mask short- and medium-term impacts that wind farms may have on these species – e.g. bustards may retain high affinity for lek sites (courtship display areas) on wind farms, as has been documented for Great bustard in Spain and Denham's bustard in South Africa. The same applies to raptors and the true impact severity may only manifest in the long term, through diminishing recruitment of new individuals over the course of multiple generations (Froneman & Loftie-Eaton, 2024).

Some species may be able to recolonise the area after the completion of construction, but other species may continue to be affected by disturbance during the operation of the WEF.

The following priority species are likely to be impacted by disturbance during the Construction Phase: African fish eagle, Martial eagle, Marsh owl, African grass owl, Spotted eagle-owl, African harrier-hawk, Black harrier, Black sparrowhawk, Black-winged kite, Jackal buzzard, Lanner falcon, Greater kestrel, Pale chanting goshawk, Secretarybird, Black stork, Blue crane, Blue korhaan, Northern black korhaan, Ludwig's bustard, Denham's bustard, Double-banded courser, Grey-winged francolin, Melodious lark, and Southern bald ibis.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-26).

Table 7-26: Significance of displacement of priority species due to disturbance

Project phase	Construction (and Decommissioning)	
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts
Possible mitigation	- Limit clearance of vegetation and disturbance to an absolute minimum and adhere to a rehabilitation plan; - Restrict construction activity to the immediate footprint of the infrastructure, particularly with respect to the proposed road network; - Prohibit service staff leaving the designated WEF footprint and access routes; - Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; - Implement measures to control noise and dust according to current best practice in the industry; - Minimise the construction of new roads by utilising existing access roads wherever possible;	

	- Adhere to the recommended All Infrastructure Exclusion Zones, with the exception of roads and underground trenches that are deemed acceptable from an aquatic ecology perspective and overhead powerlines; - Ensure Secretarybird nests within the 500 m All Infrastructure Exclusion Zone are inactive prior to upgrading existing roads in these areas; and - Install LED light-equipped BFDs on all the overhead line sections that span the modelled wetland habitat areas and ensure compliance with the latest Eskom guidelines.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between 5 and 10 years	Medium term	Impact will last between 5 and 10 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered.
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur.	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere.
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of displacement disturbance of the three Renoster wind energy facilities and grid connection on avifauna will extend across the Project cluster Site and immediate environment. The combined impact of the three wind farms and the grid connection will be low post mitigation.			

7.9.3 Assessment of Potential Impacts: Operational Phase

The following potential direct **Operational Phase** impacts on avifauna were identified:

- AV3: Displacement of priority species due to disturbance⁴³;
- AV4: Mortality of priority species due to collisions with wind turbines;
- AV5: Mortality of priority species due to electrocution in substations and/or internal reticulation network; and

⁴³ NOTE: The specialist combined the reporting of this impact for the Construction and Operational Phases. SRK has split this out and rated the Operational Phase impact. This will be assessed by the specialist in the Impact Assessment Phase.

- AV6: Mortality of priority species due to collisions with internal reticulation network.

7.9.3.1 Potential Impact AV3: Displacement of Priority Species due to Disturbance

While some bird species might be able to recolonise the area after construction, for others this might only be partially the case, resulting in lower densities than pre-construction. Disturbance is mainly attributable to the turbines themselves (visual, noise and vibration impacts) but vehicle and personnel movements on site will also contribute marginally. The effects of disturbance vary across sites and species and few studies provide comprehensive before-and-after and control impact (BACI) assessments, limiting current insights. A recent meta-analysis of long-term studies into avian displacement around wind farms found that ~50% of studies reported limited displacement from wind turbines, 46% reported a decrease in some bird populations, and 7.7% found an increased abundance of certain species around wind farms (Froneman & Loftie-Eaton, 2024).

The consequences of displacement for breeding productivity and survival crucially determine whether there is likely to be a significant impact on population size. However, studies of the impact of wind farms on breeding birds are largely inconclusive or suggest lower disturbance distances, though this apparent lack of effect may be due to the high site fidelity and long lifespan of the species studied (e.g. raptors and bustards). This might mean that the actual impacts of disturbance on breeding birds only become evident in the longer term, when new recruits replace existing breeding birds (Froneman & Loftie-Eaton, 2024).

Few studies have considered displacement for short-lived passerines (such as larks). One study showed densities of breeding grassland passerines increased with distance from wind turbines and was higher in the control area within 80m of the turbines. Minimum avoidance distances of 11 breeding passerine species were found to generally range from 14 – 93m from turbines. A study of nine wind farms in Scotland found seven of the 12 species studied exhibited significantly lower frequencies of occurrence close to the turbines, after accounting for habitat variation, and no species were more likely to occur close to the turbines. Levels of turbine avoidance suggest breeding bird densities may be reduced by 15– 53% within 500m of turbines (Froneman & Loftie-Eaton, 2024).

The following priority species are likely to be impacted by disturbance during the Operational Phase: African fish eagle, Martial eagle, Marsh owl, African grass owl, Spotted eagle-owl, African harrier-hawk, Black harrier, Black sparrowhawk, Black-winged kite, Jackal buzzard, Lanner falcon, Greater kestrel, Pale chanting goshawk, Secretarybird, Black stork, Blue crane, Blue korhaan, Northern black korhaan, Ludwig's bustard, Denham's bustard, Double-banded courser, Grey-winged francolin, Melodious lark, and Southern bald ibis.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-26).

Table 7-27: Significance of displacement of priority species due to disturbance

Project phase	Construction	
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts
Possible mitigation	• Prohibit service staff leaving the designated WEF footprint and access routes; • Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings; and • Implement measures to control noise and dust according to current best practice in the industry.	
Assessment	Without mitigation	With mitigation
Nature	On-going	Impact will last between 15 and 20 years

Duration	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Extent	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Intensity	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain/Highly probable	It is most likely that the impact will occur
Probability	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Confidence	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Reversibility	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Resource irreplaceability	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of displacement disturbance of the three Renoster wind energy facilities and grid connection on avifauna will extend across the Project cluster Site and immediate environment. The combined impact of the three wind farms and the grid connection will be low post mitigation.			

7.9.3.2 Potential Impact AV4: Mortality of Priority Species due to Collisions with Wind Turbines

Bird mortality due to collisions with wind turbines is consistently identified as a main ecological drawback to wind energy. Although collisions with wind turbines appear to kill fewer birds than collisions with other infrastructure such as power lines or buildings, or with traffic, estimates of bird deaths from collisions with wind turbines worldwide range from 0 to almost 40 deaths per turbine per year. Detectability biases such as scavenging, search efficiency and search radius are very likely to affect these numbers (Froneman & Loftie-Eaton, 2024).

The number of mortalities varies greatly among sites, with some sites posing a higher collision risk than others, and with some species being more vulnerable to collision. Additionally, even for low fatality rates, collisions with wind turbines may have a disproportionate effect on some species. For long-lived species with low productivity and slow maturation rates (e.g. raptors), even low mortality rates can have a significant impact at the population level. This is particularly important for SCC, which are often most at risk of collisions (Froneman & Loftie-Eaton, 2024).

The high mortality rates have culminated in the deployment of additional measures to reduce collisions; however, mitigation measures must be defined according to the characteristics of each wind farm and the avifauna occurring there (Froneman & Loftie-Eaton, 2024).

The following factors and how they interact with one another are important in understanding bird collision risk, which is crucial to proposing and implementing effective mitigation measures (Froneman & Loftie-Eaton, 2024):

Morphology: High wing loading (ratio of body weight to wing area) is associated with low flight manoeuvrability, which affects a bird's ability to avoid collisions. Birds with high wing loading such as vultures appear to collide more frequently with wind turbines at the same sites than birds with lower

wing loadings such as buzzards, and this is not related to their local abundance. At the Renoster 1 site, regularly occurring priority species that could potentially be vulnerable to wind turbine collisions due high wing loading are bustards and cranes.

Visual acuity: Birds are assumed to have excellent vision and yet large numbers of birds are killed by collisions with man-made structures. The visual acuity of birds seems to be slightly superior to that of other vertebrates (Martin, 2011; McIsaac, 2001). Unlike humans, who have a broad horizontal binocular field of 120°, some birds (e.g. vultures, cranes and bustards) have relatively small frontal binocular fields, and high-resolution vision areas are often found in the lateral fields of view (e.g. cranes and bustards). While some birds, e.g. priority raptors, may have wider binocular fields, these species mainly look downwards when in flight, searching for food, which puts the direction of flight completely inside their blind zone.

Phenology: Raptor collision risk has been found to be higher for resident than for migrating birds of the same species. This may be attributable to the duration spent in the area, but behaviours also contribute e.g. resident Golden eagles have been shown to fly at lower altitudes, putting them at a greater risk of collision, than migratory eagles. South Africa is at the end of the migration path for summer migrants; therefore, the phenomenon of migratory flyways where birds are concentrated in large numbers for a limited period of time, e.g. the African Rift Valley or Mediterranean Red Sea flyways, is not a feature of the landscape. The migratory priority species which could occur at the proposed WEF with some regularity, e.g., Amur falcon, Lesser kestrel, and Common buzzard will behave much the same as the resident birds once they arrive in the area. The same is valid for local migrants such as the Ludwig's bustard, Denham's bustard, Black Winged pratincole and Blue crane. It is expected that, for the period when they are present, these species will be exposed to the same risks as resident species.

Flight type: Kiting (hanging in the wind with almost motionless wings) and hovering are thought to be factors in the high collision rate of some hawks, buzzards and kestrels. These flight strategies are used during hunting, when birds may be less focused on obstacles around them and are associated with strong winds, which often produce unpredictable gusts that may suddenly change a bird's position. The priority species which could occur with some regularity at the proposed WEF can be classified as either terrestrial species, occasional long-distance fliers, or soaring species. Terrestrial species spend most of their time foraging on the ground. They do not fly often and when they do, they generally fly for short distances at low to medium altitude. At the project site, this includes Secretarybirds, Ludwig's bustard, Denham's bustard, Northern black korhaan, and Blue korhaan. Occasional long-distance fliers generally behave as terrestrial species but can, and do, undertake long distance flights on occasion, including Secretarybird, Ludwig's bustard, Blue crane, and Denham's bustard. Soaring species spend a significant time on the wing in a variety of flight modes including soaring, kiting, hovering, and gliding at medium to high altitudes. At the project site, these include all the raptors and storks which could occur i.e., Lanner falcon, Black harrier, Martial eagle, Greater kestrel, Pale chanting goshawk, Jackal buzzard, Pallid harrier, Black stork, and Yellow-billed stork. Based on the time spent potentially flying at rotor height, soaring species are at greater risk of collision.

Behaviour: Two types of avoidance have been described: 'macro-avoidance' whereby birds alter their flight path to keep clear of the entire wind farm and 'micro-avoidance' whereby birds enter the wind farm but take evasive actions to avoid individual wind turbines and this tends to be species specific. It is generally assumed that 95-98% of birds will avoid turbines. In the case of raptors, aggressive interactions with other birds may momentarily distract birds, putting them at risk of collision (a Martial eagle mortality due to collision with a wind turbine in these circumstances has been observed in South Africa). Social behaviour (flocking) has also been shown to increase collision risk (with power lines) as opposed to solitary flights.

Abundance: The abundance of priority species in the project area will fluctuate depending on the season, and especially in response to rainfall e.g., Ludwig's bustard, Denham's bustard, Lesser kestrel, Greater kestrel, Black-winged pratincole and Blue crane.

Site-specific factors: Susceptibility to collision can also heavily depend on landscape features at a wind farm site, particularly for soaring birds that predominantly rely on wind updrafts to fly. However, the project site is mostly flat to undulating and the most significant landscape features at the project site are surface water bodies. Ephemeral pans, dams and drinking troughs are likely to act as a focal point for flight activity and could attract many regularly occurring priority species, including Red Listed species such as Secretarybird, Martial eagle, Greater flamingo, Lesser flamingo, Lanner falcon and Blue crane. Raptors will also scan these areas for potential prey. Drainage lines may serve as important flight paths for waterbirds.

In summary, the following priority species could be at risk of collisions with the turbines: African fish eagle, African grass owl, African harrier-hawk, Amur falcon, Black harrier, Black sparrowhawk, Black stork, Black-winged kite, Blue crane, Blue korhaan, Common buzzard, Denham's bustard, Double-banded courser, Greater flamingo, Greater kestrel, Grey-winged francolin, Jackal buzzard, Lanner falcon, Lesser flamingo, Lesser kestrel, Ludwig's bustard, Maccoa duck, Marsh owl, Martial eagle, Melodious lark, Northern black korhaan, Pale chanting goshawk, Pallid harrier, Secretarybird, Southern bald ibis, Spotted eagle-owl, and Yellow-billed stork.

The impact of mortality of priority species due to collision with wind turbines is assessed to be of **high** significance. Although the post-mitigation significance rating is calculated as **low**, the specialist has elevated this to **medium** due to the lack of confidence in the species-specific efficacy of proposed mitigation (Table 7-28).

Table 7-28: Significance of mortality of priority species due to collisions with wind turbines

Project phase	Operational	
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts
Possible mitigation	- Adhere to the recommended All Infrastructure Exclusion Zones, with the exception of roads and underground trenches that are deemed acceptable from an aquatic ecology perspective and overhead powerlines; - Paint one or more blades of all turbines according to the specifications of a SACNASP registered avifaunal specialist and in compliance with SACAA requirements; - Deploy Radar-based Auto-SDoD systems in the Pro-active Mitigation Zones specifically optimised for flocking species, including Blue crane and Black-winged pratincole. Ensure these Radar-based SDoD systems are operated by competent and suitably qualified personnel throughout the facility's lifespan; - Employ and train a biodiversity monitoring team for the lifespan of the facility to monitor avifaunal activities on site, under the supervision of an on-site ornithological field specialist; - Continually survey the project area for the establishment of SCC nests, with an emphasis on understanding Secretarybird breeding behaviour, identifying breeding territories and new nests; - Implement predictive curtailment under defined atmospheric and weather conditions and/or Observer SDoD at turbines within 2 km of active Secretarybird nests and/or Radar-based SDoD in risk zones (as defined and to be determined by spatially explicit collision risk estimates) for Secretarybirds; - Implement live-bird monitoring and carcass searches from the commencement of the Operational Phase, as per the most recent edition of the Best Practice Guidelines; - Undertake post-construction monitoring for the first two years of operation, and then as a minimum in Year 5, and every five years thereafter for the operational lifetime of the facility (the exact scope and nature of the post-construction monitoring will be determined by the results of the monitoring through a process of adaptive management); and	

	Implement additional mitigation measures if mortality levels are significant, including selective curtailment of problem turbines during high-risk periods.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Ongoing	Impact will last between 15 - 20 years	Ongoing	Impact will last between 15 - 20 years
Extent	Regional	Impacts felt at a regional/provincial level	Municipal area	Impacts felt at a municipal level
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	High - negative		Medium - negative	
Comment on combined Renoster cluster	The combined impact of collisions of the three Renoster WEFs and grid connection on avifauna will extend beyond the Project cluster Site and immediate environment. The combined impact of the three wind farms and the grid connection will remain medium post mitigation.			

7.9.3.3 Potential Impact AV5: Mortality of Priority Species due to Electrocution in Substations and/or Internal Reticulation Network

The electrocution⁴⁴ risk is largely determined by the design of the electrical hardware, with medium voltage electricity poles posing a potential electrocution risk to raptors. While the medium voltage internal reticulation network will be installed underground wherever possible, there are a few sections overhead lines are required for technical reasons. In these instances, the poles/pylons could potentially pose an electrocution risk. Electrocutions within the proposed on-site substation are also possible; however, this is unlikely to affect more sensitive SCC, as these species are unlikely to utilise the infrastructure within the on-site substation station for perching or roosting. Species that are more vulnerable to this impact are medium-sized raptors, corvids, owls and certain species of waterbirds.

The following priority species are vulnerable to electrocution: African fish eagle, African grass owl, African harrier-hawk, African sacred ibis, Amur falcon, Black harrier, Black sparrowhawk, Black stork, Black-headed heron, Black-winged kite, Cape crow, Common buzzard, Egyptian goose, Greater kestrel, Hadada ibis, Hamerkop, Helmeted guineafowl, Jackal buzzard, Lanner falcon, Lesser kestrel, Marsh owl, Martial eagle, Pale chanting goshawk, Pallid harrier, Pied crow, Rock kestrel, Southern bald ibis, Spotted eagle-owl, Western barn owl, Western cattle egret, and Yellow-billed kite.

⁴⁴ Electrocution can occur when birds perch on an electrical structure in a manner that physically bridges the air gap between live components and/or live and earthed components, causing an electrical short circuit through the bird.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-29).

Table 7-29: Significance of mortality of priority species due to electrocution at substations or internal reticulation network

Project phase	Operational			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible mitigation	• Install internal reticulation cabling underground wherever practically possible; and • Monitor electrocution mortality in the substations and insulate live components if electrocution of SCC occurs more than once per annum.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/ definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	High - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of electrocutions of the three Renoster WEFs and grid connection on avifauna will be confined to the Project cluster Site and immediate environment, and the intensity of the impact will not increase at this scale. The combined impact of the three WEFs and the grid connection will be low post mitigation			

7.9.3.4 Potential Impact AV6: Mortality of Priority Species due to Collisions with Internal Reticulation Network

While the intention is to install the as much of the internal reticulation network underground, there are areas where the powerlines will run above ground for technical or environmental reasons. Heavy-bodied birds with limited manoeuvrability such as bustards, storks, cranes, various species of waterbirds and vultures are at risk of collisions with overhead powerlines (Froneman & Loftie-Eaton, 2024).

Powerline collisions are considered a key threat to bustards. In one study, carcass surveys were performed under high voltage transmission lines in the Karoo for two years and under low voltage distribution lines for one year. Ludwig's bustard was the most common collision victim (69% of carcasses), with bustards generally comprising 87% of mortalities. Karoo korhaan mortalities were

also recorded, but to a much lesser extent than Ludwig's bustard, probably due to their smaller size (and hence greater agility in flight).

Wind and power line priority species which are most at risk of collisions with the medium voltage power lines are the following: African black duck, African darter, African grass owl, African sacred ibis, African spoonbill, Black stork, Black-crowned night heron, Black-headed heron, Blue crane, Blue korhaan, Cape shoveler, Cape teal, Denham's bustard, Egyptian goose, Glossy ibis, Goliath heron, Great crested grebe, Great egret, Greater flamingo, Grey heron, Hadada ibis, Hamerkop, Intermediate egret, Lesser flamingo, Little egret, Little grebe, Ludwig's bustard, Maccoa duck, Marsh owl, Northern black korhaan, Red-billed teal, Red-knobbed coot, Reed cormorant, Secretarybird, South African shelduck, Southern bald ibis, Southern pochard, Spotted eagle-owl, Spur-winged goose, Western barn owl, Western cattle egret, White-breasted cormorant, White-faced whistling duck, Yellow-billed duck, and Yellow-billed stork.

In a controlled experiment spanning a period of nearly eight years, the Endangered Wildlife Trust (EWT) and Eskom tested the efficacy of two types of line markers (spirals and flappers) in reducing power line collision mortalities of large birds on three 400kV transmission lines near the Hydra substation in the Karoo. Marking was highly effective for Blue cranes, which showed a 92% reduction in mortality, and large birds in general with a 56% reduction in mortality, but not for bustards. The two marking devices were approximately equally effective (Froneman & Loftie-Eaton, 2024).

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-29).

Table 7-30: Significance of mortality of priority species due to collisions with internal reticulation network

Project phase	Operational			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible mitigation	• Install internal reticulation cabling underground wherever practically possible; • Install BFDs on all overhead line sections of the internal reticulation network as soon as the conductors are strung for the full span length, according to the latest Eskom guidelines; and • Install LED light-equipped Bird Flight Diversers (BFDs) on all the overhead line sections that span the modelled wetland habitat areas and ensure compliance with the latest Eskom guidelines.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	High - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of power line collisions of the three Renoster WEFs and grid connection on avifauna will be confined to the Project Sites and immediate environment, the intensity of the impact will increase at this scale. The combined impact of the three wind farms and the grid connection will be <i>medium</i> post mitigation.			

7.9.4 Mitigation Measures: Potential Avifauna Impacts

Essential mitigation measures during **construction** are as follows:

- Limit clearance of vegetation and disturbance to an absolute minimum and adhere to a rehabilitation plan;
- Restrict construction activity to the immediate footprint of the infrastructure, particularly with respect to the proposed road network;
- Adhere to the recommended All Infrastructure Exclusion Zones, with the exception of roads and underground trenches which are deemed acceptable from an aquatic ecology perspective and overhead powerlines;
- Ensure Secretarybird nests within the 500m all infrastructure exclusion zone are inactive prior to upgrading existing roads in these areas;
- Install internal reticulation cabling underground wherever practically possible;
- Install LED light-equipped Bird Flight Diverters (BFDs) on all the overhead line sections that span the modelled wetland habitat areas, and ensure compliance with the latest Eskom guidelines;
- Prohibit service staff leaving the designated WEF footprint and access routes;
- Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings;
- Minimise the construction of new roads by utilising existing access roads wherever possible; and
- Implement measures to control noise and dust according to current best practice in the industry.

Essential mitigation measures during **operations** are as follows:

- Prohibit service staff leaving the designated WEF footprint and access routes;
- Restrict site access and enforce the prohibition of disturbance or removal of fauna or flora from the site and its surroundings;
- Implement measures to control noise and dust according to current best practice in the industry;
- Adhere to the recommended All Infrastructure Exclusion Zones, with the exception of roads and underground trenches that are deemed acceptable from an aquatic ecology perspective and overhead powerlines;
- Install LED light-equipped BFDs on all the overhead line sections that span the modelled wetland habitat areas, and ensure compliance with the latest Eskom guidelines;

- Paint one or more blades of all turbines according to the specifications of a SACNASP registered avifaunal specialist and in compliance with SACAA requirements;
- Deploy Radar-based Auto-SDoD systems in the Pro-active Mitigation Zones specifically optimised for flocking species, including Blue crane and Black-winged pratincole. Ensure these Radar-based SDoD systems are operated by competent and suitably qualified personnel throughout the facility's lifespan;
- Employ and train a biodiversity monitoring team for the lifespan of the facility to monitor avifaunal activities on site, under the supervision of an on-site ornithological field specialist;
- Continually survey the project area for the establishment of SCC nests, with an emphasis on understanding Secretarybird breeding behaviour, identifying breeding territories and new nests;
- Implement predictive curtailment under defined atmospheric and weather conditions and/or Observer SDoD at turbines within 2 km of active Secretarybird nests and/or Radar-based SDoD in risk zones (as defined and to be determined by spatially explicit collision risk estimates) for Secretarybirds;
- Implement live-bird monitoring and carcass searches from the commencement of the Operational Phase, as per the most recent edition of the Best Practice Guidelines;
- Undertake post-construction monitoring for the first two years of operation, and then as a minimum in Year 5, and every five years thereafter for the operational lifetime of the facility (the exact scope and nature of the post-construction monitoring will be determined by the results of the monitoring through a process of adaptive management); and
- Implement additional mitigation measures if mortality levels are significant, including selective curtailment of problem turbines during high-risk periods.

7.9.5 No-Go Alternative

The No-Go alternative will result in the current status quo being maintained as far as avifauna is concerned. The low human population in the area is definitely advantageous to sensitive avifauna, especially SCC. The No-Go option would eliminate any additional impact on the ecological integrity of the proposed development site as far as avifauna is concerned.

7.9.6 Potential Cumulative Impacts

Other renewable energy projects in a 50 km radius of the site are solar, so the most important cumulative impacts on avifauna relate to collisions with powerlines, loss of habitat and displacement due to disturbance. The cumulative impact on avifauna is considered to be of **medium** significance.

7.9.7 Impact Statement

The proposed Renoster 1 Wind Farm will have **high** and **medium** impacts on avifauna that can be reduced to **medium** and **low** impacts through the application of mitigation measures. The preliminary layout has taken all avifaunal risk zones into consideration and has adequately avoided or addressed the **High** risk areas identified to date.

No fatal flaws are expected; however, the mitigation measures listed above must be strictly applied.

7.9.8 Recommendations for the Impact Assessment Phase

Detailed Collision Risk Modelling incorporating species passage rates, collision probability and exposure will be conducted during the Impact Assessment Phase of the project.

The Final Avifauna Specialist Assessment will consider and assess the revised WEF layout.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database.

7.10 Potential Impacts on Bats

7.10.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Bat Specialist Assessment undertaken by Animalia (see Appendix H8). The purpose of the study was to assess the potential impacts of the project on bat species, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (Animalia Consultants, 2024).

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area with reference to bat species, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the construction and operation and Decommissioning Phases, followed by a narrative description of each impact and a presentation of the assessment impact, using a prescribed impact rating methodology;
- Identify and describe potential collective impacts of the project in relation to the other components of the Renoster Wind Farm Development as well as cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area, in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign.

The site was evaluated by studying the literature and available satellite imagery and through site inspections to identify man-made structures, vegetation, including dense tree clumps, topography and surface rock outcrops, surface water and drainage. Potential roosts were investigated visually by day, and bat activity was investigated using thermal imaging by night.

These data were used to optimally deploy 19 passive bat detection systems across the cluster. These bat monitoring systems comprise seven Short Mast systems with bat detectors at 7 m and four Meteorological Mast (Met Mast) systems, which have separate bat detectors at 7 m, 60 m and 120 m. Two short masts and one Met Mast (comprising five of the 19 detector systems) are located within the Renoster 1 Wind Farm site boundary, but due to the highly mobile nature of bats, data from the entire monitoring programme is considered in the analysis.

A twelve-month monitoring programme was initiated, which concluded in December 2024. This report considers data collected from December 2023 – April 2024, which were analysed by counting positive bat passes and classifying these as near to species level as possible. Results will be updated to include the full 12 months of data in the next phase of reporting (Animalia Consultants, 2024).

7.10.2 Assessment of Potential Impacts: Construction Phase

The following potential direct Construction Phase impacts on bats were identified:

- BA1: Destruction of Bat Roosts; and
- BA2: Loss of Foraging Habitat.

7.10.2.1 Potential Impact BA1: Destruction of Bat Roosts

Potential roosting spaces on site include man-made structures such as houses and farm buildings, as well as trees with hollows, fissures and loose bark. During construction, these may be permanently lost. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-31).

Table 7-31: Significance of destruction of potential bat roosts

Project phase	Construction			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	- Adhere to the bat sensitivity No-Go areas when considering the placement of any infrastructure; and - Notify the Environmental Compliance Officer (ECO) immediately if additional bat roosts are encountered, who must seek advice from a bat specialist on the way forward.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The three WEFs will potentially result in the loss of more bat roosts. Nevertheless, the combined impact of all the cluster is considered to be of very low significance with mitigation.			

7.10.2.2 Potential Impact BA2: Loss of Foraging Habitat

Some foraging habitat will be permanently lost by construction of turbines and access roads. Temporary foraging habitat loss will occur during construction due to clearance of ground for storage areas and movement of heavy vehicles. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-31).

Table 7-32: Significance of loss of foraging habitat

Project phase	Construction			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	- Adhere to bat sensitivity No-Go areas when considering the placement of any infrastructure; - Limit the footprint of disturbance by ensuring that storage of materials and equipment is restricted to designated areas; - Ensure construction vehicles keep to designated roads; and - Rehabilitate all temporary construction areas as soon as practically possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The combined impact of the three WEFs will result in loss of foraging habitat over a larger area. However, the actual footprint of disturbance is scattered, and the combined area of these impacts is relatively small in comparison to the entire wind farm envelope, so the combined impact is assessed to be of low significance.			

7.10.3 Assessment of Potential Impacts: Operational Phase

The following potential direct Operational Phase impacts on bats were identified:

- BA3: Bat Mortalities due to Direct Blade Impact or Barotrauma During Foraging; and
- BA4: Bat Mortalities due to Direct Blade Impact or Barotrauma During Migration.

7.10.3.1 Potential Impact BA3: Bat Mortalities due to Direct Blade Impact or Barotrauma During Foraging

Although bats are capable of advanced navigation using echolocation and excellent sight, they are at risk of collisions with wind turbine blades. Bats may also be susceptible to barotrauma, a condition where differential pockets of high and low air pressure around the moving blades of wind turbines causes the lungs of bats to collapse, resulting in fatal internal haemorrhaging.

Some studies suggest that bats may be attracted to the large turbine structures as roosting spaces. Furthermore, it is hypothesised that swarms of insects may be trapped in low pressure air pockets

around turbines, and that lights on turbines attract insects, encouraging the presence of bats. A number of other factors may contribute to mortalities, including noise and electromagnetic fields from turbines interfering with echolocation, but the extent of these effects is unknown. It may simply be that the echolocation capabilities of bats are designed to locate small insect prey or avoid stationary objects and may not be attuned to detect unnatural objects moving sideways across the flight path.

Commonly occurring or abundant bats (generally with lower conservation statuses) are at greater risk of collision with wind turbines than less abundant species by virtue of their numbers. Open air foragers are also more at risk as they generally fly higher than clutter edge foragers, which tend to fly closer to ground level. The species at highest risk of collisions with turbines at the site, *T. aegyptiaca*, is an open-air forager regularly flying at heights corresponding with the rotor swept zone of most turbine specifications. In the period between 2011 and 2020 across 25 operational WEFs in South Africa, 45% of all bat carcasses identified were *T. aegyptiaca*.

Mortalities of resident bats due to interaction with moving wind turbine blades during foraging can have a significant effect on bat populations, as the impact persists over the lifetime of the facility. Assuming a maximum rotor diameter of 240m, blade overhang of Turbine 32 intrudes into the high bat sensitivity buffer around Roost Siberia. The impact is assessed to be of **high** significance and with the implementation of mitigation is reduced to **low** (Table 7-31).

Table 7-33: Significance of bat mortalities due to blade impact or barotrauma during foraging

Project phase	Operational	
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts
Possible Mitigation	- Relocate or remove Turbine 32 in the revised layout; - Commission a bat monitoring programme as set out in Chapter 10 of the Specialist Bat Assessment for the first two years of operation; - Audit bat mortalities every five years after the initial two-year operational monitoring programme for the lifetime of the facility. - Modify existing mitigation or implement additional mitigation in consultation with a bat specialist for turbines causing the highest mortalities if above-threshold mortalities are occurring; - Minimise the creation of artificial foraging habitat by keeping lighting on infrastructure to a minimum, while still adhering to safety and security requirements and ensure lighting is appropriately designed, inter alia: - Fit exterior lights with passive motion sensors such that they switch off automatically to prevent the creation of regular insect gathering pools; - Use lights with a colour temperature below 4000 Kelvin that that attract fewer insects ("warm white", yellow or amber); - Fit floodlights with hoods to limit lighting to essential areas on the ground; - Conduct bi-annual specialist inspections of the WEF at night, for the lifetime of the facility, to assess whether the lighting mitigation measures are effective; - Design an effective system of stormwater runoff control where required (i.e. any points where runoff might accumulate) to avoid the creation of artificial water sources within 320m of all turbines; - Ensure joints under roofs of all new buildings are well sealed with a durable, flexible sealant; - Design culverts with minimum holes and hollows, especially in the ceilings, and fill any holes or hollows to be flush with the ceiling of the culvert; - Feather turbine blades to prevent freewheeling when windspeeds drop below the cut-in speed from sunset to sunrise during peak activity periods (1 December – 30 April); - Apply an increased (mitigation) cut-in speed if bat mortality monitoring shows that above threshold mortality rates are occurring; - Implement an inspection programme to identify any new roosts in man-made structures and contract a qualified bat specialist evict such roosts during the appropriate season.	
Assessment	Without mitigation	With mitigation
Nature	Negative	Negative

Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	High - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of the three WEFs will increase the extent of bat mortality impacts and potentially will increase the number and diversity of bat populations impacted. The combined impact is considered to be of high significance but can be reduced to medium significance with mitigation.			

7.10.3.2 Potential Impact BA4: Bat Mortalities due to Direct Blade Impact or Barotrauma During Migration

Migratory bats tend to be cave dwelling and play a critical role in cave ecology by being the major source of energy input into cave ecosystems through deposition of guano. Cave ecosystems are isolated and often contain unique and specialised faunal species and communities. If bats are killed in significant numbers during migrations, cave ecosystems are likely to be impacted. It is not known whether any such migrations exist in the region and data collected to date does not indicate any clear signs that bat migration routes exist across the site.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-31).

Table 7-34: Significance of bat mortalities due to blade impact or barotrauma during migration

Project phase	Operational			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible mitigation	• Feather turbine blades to prevent freewheeling when windspeeds drop below the cut-in speed from sunset to sunrise during peak activity periods (1 December – 30 April); • Apply an increased (mitigation) cut-in speed if bat mortality monitoring shows that above threshold mortalities are occurring; and • Modify existing mitigation or implement additional mitigation in consultation with a bat specialist to turbines causing the highest mortalities if above threshold mortalities are occurring.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years

Extent	Regional	Impacts felt at a regional/provincial level	Regional	Impacts felt at a regional/provincial level
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Low	Judgement is based on intuition	Low	Judgement is based on intuition
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	The combined impact of the three WEFs may increase the probability of a bat migration path crossing the WEF area thereby increasing the likelihood of migrating bats being killed. Nevertheless, the combined impact significance rating for this impact remains low with mitigation.			

7.10.4 Mitigation Measures: Potential Impacts on Bats

Essential mitigation measures during **construction** are as follows:

- Adhere to the bat sensitivity No-Go areas when considering the placement of any infrastructure;
- Notify the ECO immediately if additional bat roosts are encountered, who must seek advice from a bat specialist on the way forward;
- Limit the footprint of disturbance by ensuring that storage of materials and equipment is restricted to designated areas;
- Ensure construction vehicles keep to designated roads; and
- Rehabilitate all temporary construction areas as soon as practically possible.

Essential mitigation measures during **operations** are as follows:

- Relocate or remove Turbine 32 in the revised layout;
- Commission a bat monitoring programme for the first two years of operations;
- Audit bat mortalities every five years after the initial two-year operational monitoring programme for the lifetime of the facility.
- Modify existing mitigation or implement additional mitigation in consultation with a bat specialist to turbines causing the highest mortalities if above threshold mortalities are occurring;
- Minimise the creation of artificial foraging habitat by keeping lighting on infrastructure to a minimum, while still adhering to safety and security requirements and ensure lighting is appropriately designed, inter alia:
 - Fit exterior lights with passive motion sensors such that they switch off automatically to prevent the creation of regular insect gathering pools;

- Use lights with a colour temperature below 4000 Kelvin that attract fewer insects ("warm white", yellow or amber);
- Fit floodlights with hoods to limit lighting to essential areas on the ground;
- Conduct bi-annual specialist inspections of the WEF at night, for the lifetime of the facility, to assess whether the lighting mitigation measures are effective;
- Minimise the creation of artificial foraging habitat by avoiding the creation of artificial water sources within 320m of all turbines;
- Avoid creation of artificial roosting habitat by ensuring joints under roofs of all new buildings are well sealed with a durable, flexible sealant;
- Implement an inspection programme to identify any new roosts in man-made structures and contract a qualified bat specialist evict such roosts during the appropriate season;
- Design culverts with minimum holes and hollows, especially in the ceilings, and fill any holes or hollows to be flush with the ceiling of the culvert;
- Feather turbine blades to prevent freewheeling when windspeeds drop below the cut-in speed from sunset to sunrise during peak activity periods (1 December – 30 April);
- Apply an increased (mitigation) cut-in speed if bat mortality monitoring shows that above threshold mortality rates are occurring; and
- Apply additional curtailment and/ or install bat acoustic deterrent on turbines causing the highest mortalities if mortalities of migratory species exceed sustainable thresholds for the region.

7.10.5 The No-Go Alternative

The No-Go alternative is preferred as regards impacts on bats; however, effective application of the mitigation measures listed above will minimise the impact on bats to an acceptable degree.

7.10.6 Potential Cumulative Impacts

Cumulative impacts of the Renoster 1 Wind Farm in conjunction with other (approved but not necessarily commissioned) renewable energy developments in a 50 km radius of the cluster were assessed. The only renewable energy projects currently approved in the 50 km radius of the cluster are in fact all solar photovoltaic projects, so there will be no cumulative operational impacts resulting from blade impact or barotrauma. However, consideration of cumulative Construction Phase impacts resulting from habitat loss and destruction of roosts is valid.

The specialist asserts that if each renewable energy facility in the cumulative impact zone respects their individual bat sensitivity mapping and applies the mitigation measures specified in Section 7.10.4 (per facility), all cumulative impacts will be reduced to **low** or **very low** significance (Animalia Consultants, 2024).

7.10.7 Impact Statement

All infrastructure in the preliminary layout, with the exception of Turbine 32, is appropriately located to avoid or minimise bat impacts in the project area. Assuming rotor diameter of 240m (the maximum considered), blade overhang of Turbine 32 intrudes into the 1km buffer around high sensitivity Roost Siberia. This turbine should be shifted or removed from the layout.

Findings of the Preliminary Specialist Bat Assessment may be refined based on analysis of the full 12-month monitoring programme; however, the specialist is confident that negative impacts anticipated to result from the construction and operation of the WEF can be effectively reduced to at least a **low**

significance with the effective application of mitigation measures outlined above and detailed in Appendix H8.

The combined impact of all three Renoster WEFs and associated grid connection is likely to be of **low** and **medium** significance with mitigation.

The cumulative impact of the Renoster 1 Wind Farm in conjunction with other renewable energy developments in a 50km area relates to Construction Phase impacts only and is considered to be of **low** significance.

Data collected to date suggest that there are no fatal flaws from a bat sensitivity perspective that should prevent the Renoster 1 Wind Farm from proceeding.

7.10.8 Recommendations for the Impact Assessment Phase

Analyses will be updated based on the full 12-month monitoring dataset. Adjustments may be required to mitigation measures once behavioural trends have been more comprehensively analysed.

The Final Bat Specialist Assessment will consider and assess the revised WEF layout.

The cumulative assessment will be updated to reflect the latest DFFE Renewable Energy Environmental Authorisation database.

7.11 Potential Socio-Economic Impacts

7.11.1 Preliminary Impact Assessment and Mitigation

The Socio-economic baseline study (Appendix H9) has identified potential impacts that require investigation and assessment in the Impact Assessment Phase once broad consultation at the Scoping Phase has occurred and the project specifications are more concrete (Independent Economic Researchers, 2024).

7.12 Potential Noise Impacts

7.12.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Noise Specialist Assessment undertaken by Enviro Acoustic Research cc (see Appendix H10). The purpose of the study was to assess the potential noise impacts of the project, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits.

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area with reference to noise, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the Construction and Operational Phases;
- Identify and describe potential cumulative impacts of the project in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

Potential noise-sensitive receptors (NSRs) were identified using Google Earth® up to 2 000 m from the site boundary by both Red Cap and EARES. More than 50 sites (excluding the towns of Edenville and Ngwathe), each with various structures that are or could potentially be used for residential purposes were included in the analysis. These potential NSRs were verified during a site visit in April 2024, with verified NSRs indicated in Figure 7-4. A number of potential noise-sensitive locations (PNS) are also shown in Figure 7-4. These PNSs were defined on the basis that:

- A structure, although present, is apparently not occupied, but its future uses are unknown; and/or
- The location was not visited to verify the use of the structure; and / or
- The PNS location is further than 2 500m from nearest proposed wind turbine location.

Noise levels were assessed at both NSR and PNS locations.

Because the National Noise Control Regulations (NCR) and SANS 10103:2008 do not cater for instances when background noise levels change due to the impact of extraneous forces (such as noises induced by higher wind speeds), this assessment used international guidelines and local regulations to recommend more appropriate noise limits for this project. This is important, as the wind turbines will only operate during periods of higher wind speeds, a period that may coincide with higher ambient sound levels. This assessment therefore recommends and adopts an upper night-time noise limit of 45 dBA and a daytime noise limit of 50 dBA. Ambient (background) sound levels were measured over a period of eight nights from 4 – 12 April 2024 at eight locations and are considered to represent typical ambient sound levels in the area. Measurements were taken in accordance with the South African National Standard (SANS) 10103:2008 guidelines. SANS 10103:2008 guidelines and international guidelines were consulted to establish appropriate noise limits/thresholds for the (rural) area and an ISO 9613-2 noise propagation model was used to calculate potential noise emissions.

Impacts of Noise

Sound is created when an object vibrates and radiates energy as acoustic pressure or waves through a medium, such as air, water or a solid. Sound and noise are measured in units of decibels (dB). The dB scale is not linear but logarithmic. This means, for example, that if two identical noise sources, each producing 60 dB, operate simultaneously they will generate 63 dB. Similarly, a 10 dB increase in sound levels represents a ten-fold increase in sound energy.

The human ear is not equally receptive to all frequencies of sound. The A-weighting of sound levels is a method used to approximate how the human ear would perceive a sound, mostly by reducing the contribution from lower frequencies by a specified amount and is reported as dBA.

With respect to noise impacts, 3 dBA is the smallest perceptible change in sound pressure level for a person of normal hearing sensitivity and therefore any noise level increase lower than this would have no impact. An increase of 5 dBA would be noticeable and an increase of 10 dBA would correspond to doubling of the subjective loudness of noise and typically would elicit a significant community response.

Sound levels diminish with distance from the source because of dispersion. In simple terms, for point sources, the distance attenuation would be approximately 6 dBA per doubling of distance from the source. For line sources the same attenuation is approximately 3 dBA.

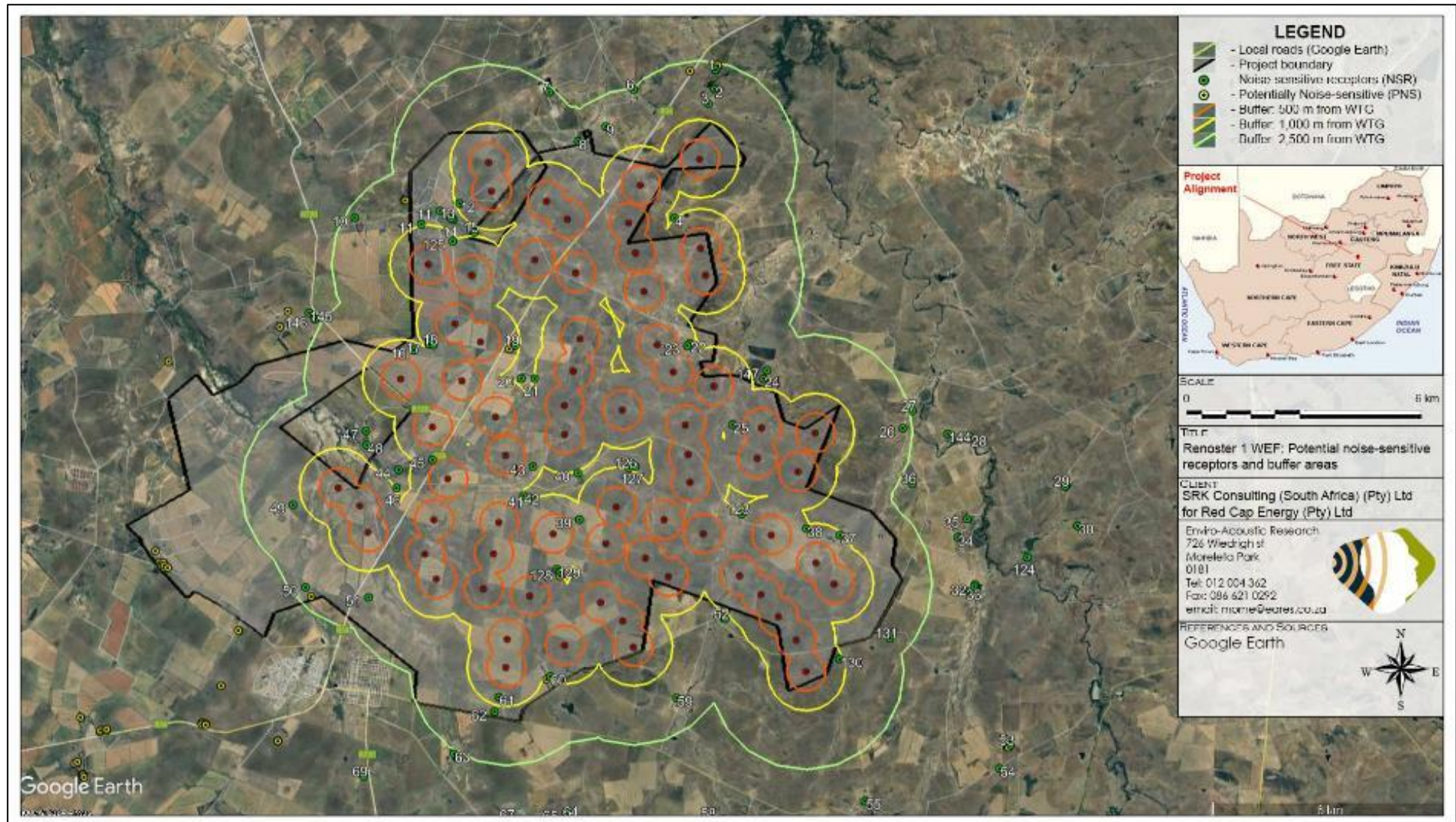


Figure 7-4 Potential NSRs in and around the Renoster 1 Wind Farm site

Source: (Enviro Acoustic Research cc, 2024)

Noise intensity criteria are provided in Table 7-35.

Table 7-35: Noise impact intensity criteria

Impact category	Change in noise	Impact description
No Effect	0 dBA	Not discernible
Negligible	0.1 to 2.9 dBA	Not discernible <i>Marginal changes in noise levels of less than 3 dBA in residential areas or outdoor recreational areas in close proximity to main roads</i>
Minor	3 to 4.9 dBA	Noticeable <i>Noise levels of 3-5 dBA in residential areas or at outdoor recreational areas</i>
Moderate	5 to 9.9 dBA	Considerable <i>Noise levels warrant mitigation of residential properties on a widespread basis in a community, or for outdoor recreation areas close to main roads.</i>
Major	10 dBA or more	Major adverse <i>Noise increases to a level where continued residential use of individual properties is inappropriate, or where the use of a community building could be inappropriate.</i>

7.12.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** noise impacts were identified:

- NO1: Increased noise levels during construction or upgrading of roads;
- NO2: Increased noise levels due to construction traffic;
- NO3: Increased noise levels associated with development and assembly WEF infrastructure; and
- NO4: Increased ambient noise levels at night.

7.12.2.1 Potential Impact NO1: Increased Noise Levels During Construction or Upgrading of Roads

Noise levels could increase above the rural rating level (45 dBA) and recommended noise limit (50 dBA) at some “suburban” receptors (e.g. farmsteads) during construction or upgrading of access roads. Potential noises associated with the construction (or upgrading) of access roads were calculated using a basic noise model and although these noise levels are expected to be high, the duration of the noise will be brief. Noise levels may be briefly higher than 45 dBA and 50 dBA at NSR 19, 20, 21, 37, 38, 42, 52, 50, 131, 145 and 180 as construction equipment passes these receptors.

The impact is assessed to be of **low** significance. No mitigation is possible or required (Table 7-36).

Table 7-36: Significance of increased noise levels during construction and/or upgrading of roads

Project phase	Construction	
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts
Possible Mitigation	Not required.	
Assessment	Without mitigation	With mitigation
Nature	Negative	Negative

Duration	Immediate	Impact will self-remedy immediately	Immediate	Impact will self-remedy immediately
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low – negative		Low - negative	
Comment on combined Renoster cluster	The combined noise impact from road construction activities at the three Renoster WEFs and Grid Infrastructure will remain low .			

7.12.2.2 Potential Impact NO2: Increased Noise Levels due to Construction Traffic

Trucks and other vehicles passing potential NSRs will increase noise levels. Noise generated by construction traffic (road traffic noise) was estimated and plotted against distance and will be audible for a short period at several potential NSRs. The impact is assessed to be of **very low** significance. No mitigation is possible or required (Table 7-37).

Table 7-37: Significance of increased noise levels due to construction traffic

Project phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Not required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between one and five years	Short term	Impact will last between one and five years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Extremely high	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur

Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The combined noise impact from construction traffic at the three Renoster WEFs and Grid Infrastructure will remain very low .			

7.12.2.3 Potential Impact NO3: Increased Noise Levels during Construction of WEF Infrastructure

Construction of WEF infrastructure will increase ambient sound levels at potential NSRs. As the construction schedule will only be developed at a later stage, a conservative approach was adopted in the noise model where the noisiest activity (i.e. laying turbine foundations, which requires various equipment to operate simultaneously) was used to estimate the impact of construction noise at all locations where wind turbines may be erected on potential NSRs⁴⁵ (see Figure 7-5).

Construction noise could be audible at NSRs up to 1 500 m distant during quiet periods. The impact is assessed to be of **very low** significance. No mitigation is possible or required (Table 7-38).

Table 7-38: Significance of increased noise levels during construction of WEF infrastructure

Project phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Not required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact

⁴⁵ The potential overall (worst-case) noise level due to combined construction activities at an NSR are plotted against the distance from the NSR and a potential construction activity. As the expected noise level is expected to be less than 35 dBA at NSR further than a 1,500m from a construction activity or an operational wind turbine, NSR further than 1,500m from the closest wind turbine were not included in this figure.

Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The combined noise impact from WEF infrastructure construction activities at the three Renoster WEFs and Grid Infrastructure will remain very low .			

7.12.2.4 Potential Impact NO4: Increased Ambient Noise Levels at Night

Noise levels could increase above the rural rating level (35 dBA) and recommended night time noise limit (40 dBA) at some “suburban” receptors (e.g. farmsteads) during construction or upgrading of access roads if construction activities extend into the night (unplanned). Potential noises associated with the construction of turbine components were calculated using a basic noise model. Noise levels may be higher than 45 dBA and 50 dBA at a number of NSRs for short periods during the construction phase.

The impact is assessed to be of **low** significance. No mitigation is possible or required (Table 7-39).

Table 7-39: Significance of increased ambient sound levels at night

Project phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Not required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	Combined noise impact from night-time construction activities at the three Renoster WEFs and the Grid Infrastructure will remain low .			

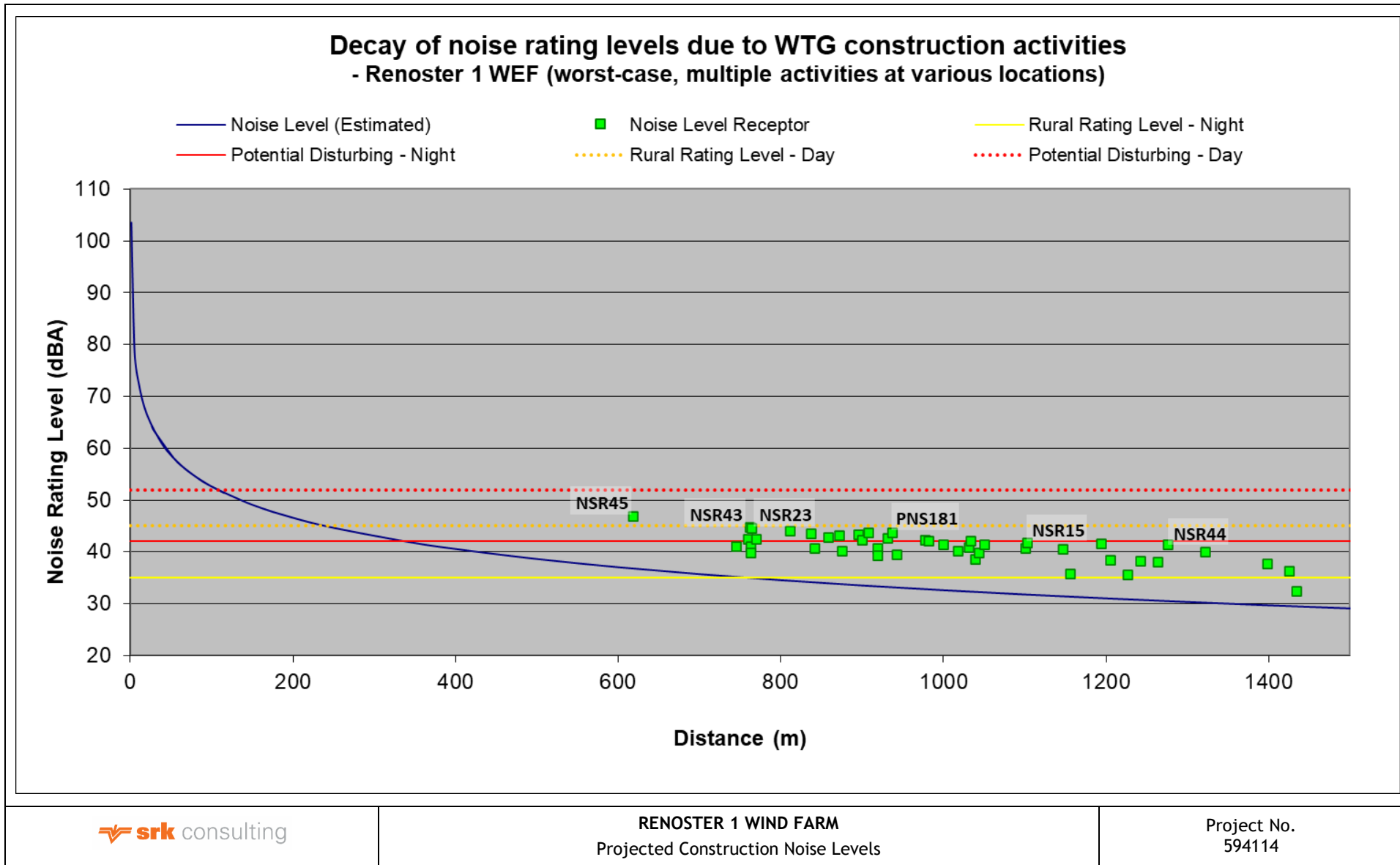


Figure 7-5: Projected conceptual construction noise levels at NSRs

Source: (Enviro Acoustic Research cc, 2024)

7.12.3 Assessment of Potential Impacts: Operational Phase

The following **Operational Phase** impacts on noise sensitive receptors were identified:

- NO5: Increased ambient daytime noise levels affecting receptors; and
- NO6: Increased ambient night-time noise levels affecting receptors.

Sound emitted by operational wind turbines is associated with two sources:

- **Aerodynamic sources**, directly related to the passage of air over the wind turbine blades. Therefore, as wind speed increases, sound generated by the wind turbine also increases. At a low wind speed, the sound created by the wind turbine is generally (relatively) low and increases to a maximum at a certain wind speed whereafter it either remains constant, increases very slightly or even drops. Although this sound is generally constant and steady, in some circumstances, a periodically fluctuating component can arise synchronised to the blade rotational speed, sometimes referred to as a “swish” or “thump”.
- **Mechanical sources**, associated with components of turbines housed within the nacelle, such as the gearbox, generator and control equipment for yaw, blade pitch, etc. Mechanical sound is normally perceived as a tonal noise, which is subjectively more intrusive than a broad band noise of the same sound pressure level. Where noise complaints have been received at operational wind farms, tonal noise from the installed wind turbines has been the primary cause for complaint. However, this tonal noise is associated with older wind turbines and new generation wind turbine generators do not emit any clearly distinguishable tones.

The sound generated by wind turbines varies among models. Wind turbine manufacturers also provide their equipment with control mechanisms to facilitate noise reduction during operation that can include:

- Reduction of rotational speed;
- Increase of the pitch angle and/or reduction of nominal generator torque to reduce the angle of attack;
- Implementation of blade technologies such as serrated trailing edges (STE), changing the shape of the blade tips or the edge; and
- Insulation of the nacelle.

As it is not known what turbine technology will be available should the project proceed, a conservative approach is adopted for this assessment. The noise model assumes the high-sound power emission level (PWL) Goldwind GWH-182 6.2 MW wind turbine will be used, which has a PWL of 110.0 dBA.

Generally, noises from wind turbines:

- Are likely to be disturbing to receptors located within 500 m of operational wind turbines;
- Are normally limited to a distance of approximately 1 000m from operational wind turbines during the day; and
- Are likely to be audible up to 2 500m from wind turbines at night (beyond 2 500m, the sound is unlikely to be audible, except under certain meteorological conditions).

In addition, other components of operational WEFs also generate noise, including:

- **BESS** - While certain components may generate a slight hum under load, the dominant source of noise emanates from the fans or climate control system. This low-level noise is confined to areas within ~200m of the BESS and is considered insignificant.

- **Substations** – Transformers in substations generate a tonal hum, known as magnetostriction. This noise is confined to areas within ~200m of the transformers and is considered insignificant.
- **Transmission lines** – Under foggy or rainy conditions, lines of >70 kV can generate corona noise, an audible and radio-frequency noise. This is an infrequent occurrence and generally transmission lines are designed to avoid this as far as possible.

7.12.3.1 Potential Impact NO5: Increased Ambient Daytime Noise Levels Affecting Receptors

Wind turbines will only operate during periods of elevated wind speed, when it is expected that ambient sound levels will be higher due to wind-induced noises. Nevertheless, noise levels (from the WEF) are expected to comply with and be significantly lower than the IFC daytime noise limits. Although some receptors may hear the operating turbines, even under a hypothetical worst-case scenario⁴⁶ when all three Renoster WEFs are operating simultaneously, this is not expected to cause any disturbance.

The impact is assessed to be of **low** significance. No mitigation is required (Table 7-40).

Table 7-40: Significance of increased ambient daytime noise levels affecting receptors

Project phase	Operational			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Not required.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/or social functions and/or processes are moderately altered	Moderate	Natural and/ or social functions and/or processes are moderately altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Low - negative	

⁴⁶ This finding will be valid for any wind turbine with a PWL equal or higher than 108.0 dBA, though noise monitoring will be required in areas where noise levels are expected to exceed 42 dBA based on the model outputs used in this assessment (if a turbine with a PWL of higher than 110.0 dBA is used noise levels must be remodelled to inform the monitoring and possible mitigation plan).

Comment on combined Renoster cluster	Combined noise impact from daytime operational activities at the three Renoster WEFs and the Grid Infrastructure will have a low significance.

7.12.3.2 Potential Impact NO6: Increased Ambient Night-time Noise Levels Affecting Receptors

Wind turbines will only operate during periods with elevated wind speeds when it is expected that ambient sound levels will be higher due to wind-induced sound. In a hypothetical worst-case scenario⁴⁷, including considering the simultaneous operation of all three Renoster WEFs, night-time noise levels may exceed 45 dBA at NSRs 18, 21, 22, 23, 25, 39, 41, 42, 43, 45, 124, 129, 130, 164 and 181 at few times a year, if ever.

The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-41).

Table 7-41: Significance of increased ambient night-time noise levels affecting receptors

Project phase	Operational			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Design and implement a noise abatement programme for wind turbines in areas where the recommended 45 dBA night-time ambient sound level is exceeded.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	Combined impact from nighttime operational activities at the three Renoster WEFs and Grid Infrastructure may have a medium significance before the implementation of potential mitigation measures.			

⁴⁷ This finding will be valid for any wind turbine with a PWL equal or higher than 108.0 dBA, though noise monitoring will be required in areas where noise levels are expected to exceed 42 dBA based on the model outputs used in this assessment (if a turbine with a PWL of higher than 110.0 dBA is used noise levels must be remodelled to inform the monitoring and possible mitigation plan).

7.12.4 Assessment of Potential Impacts: Decommissioning Phase

The following Decommissioning Phase impact on noise sensitive receptors was identified:

- NO7: Increased noise levels affecting receptors.

7.12.4.1 Potential Impact NO7: Increased Noise Levels Affecting Receptors

Increased numbers of trucks and other vehicles passing noise sensitive receptors may increase noise levels. The impact is assessed to be of **very low** significance. No mitigation is possible or required (Table 7-42).

Table 7-42: Significance of increased noise levels affecting receptors

Project phase	Decommissioning			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	No mitigation required due to the very low significance of the impact.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between one and five years	Short term	impact will last between one and five years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The combined noise impact from daytime decommissioning activities at the three Renoster WEFs and the Grid Infrastructure will remain very low .			

7.12.5 Mitigation Measures: Potential Noise Impacts

No mitigation measures are proposed for the **Construction** and **Decommissioning Phases** as these will not change the significance of noise impacts.

Essential mitigation measures during **operations** are as follows:

- Design and implement a noise abatement programme for wind turbines in areas where the recommended 45 dBA ambient night-time sound level is exceeded.

7.12.6 No-Go Alternative

Should the No-Go alternative be pursued, ambient noise levels in the project area will remain unchanged and the area would retain its current rural noise character.

7.12.7 Cumulative Impacts

No other known sources of noise warrant inclusion in an analysis of cumulative noise impacts at the project site.

7.12.8 Impact Statement

The project is considered acceptable from a noise perspective, subject to the:

- Night-time noise levels being kept below 45 dBA at all noise sensitive receptors; and
- Design and implementation of a noise monitoring and abatement programme should a turbine location that will result in noise rating levels exceeding 42 dBA at noise sensitive receptors be included in the final layout.

There is no potential for a cumulative noise impact and as such cumulative noise impacts are insignificant.

Subject to these conditions, it is recommended that the project be authorised.

7.12.9 Recommendations for the Impact Assessment Phase

The noise impact should be re-evaluated should the layout be revised where:

- Any turbine located within 2 500 m from a confirmed noise sensitive receptor be moved closer to the noise sensitive receptor;
- Any new turbine is introduced within 2 500 m from a noise sensitive receptor; and/or
- The number of turbines within 2 500 m from noise sensitive receptors be increased.

If a turbine with sound power higher than 110 dBA is selected, noise impacts should be re-evaluated.

7.13 Potential Traffic and Transport Impacts

7.13.1 Introduction, Terms of Reference and Methodology

Construction of WEFs require the transport of infrastructure components to and from the project site, mainly during the construction and Decommissioning Phases. This assessment is based on the Preliminary Traffic and Transport Specialist Assessment undertaken by Zutari (see Appendix H11).

The ToR for the study were to:

- Identify the local road network impacted by the project;
- Assess the possible access roads and entry points to the site;
- Determine possible freight routes between port(s) of entry or local manufacturing centres;
- Estimate a baseline traffic volume for the locality to assess the potential impact of traffic volumes generated through the construction, operation and decommissioning activities;
- Assess the impact of different phases of the project on traffic; and
- Determine mitigation measures to reduce the negative impacts on traffic.

A high-level desktop traffic and transport assessment was undertaken to assess the impacts of the Renoster 1 Wind Farm project.

Trip rates were estimated based on previous (similar) projects and other WEFs. The scheduling and management of the delivery trips are important for construction activities and the construction programme and traffic management plan may have delivery trips specifically scheduled for off peak times (Zutari (Pty) Ltd, 2024).

7.13.2 Assessment of Impacts: Construction (and Decommissioning) Phase

The following potential direct **Construction Phase** impacts on traffic were identified (and similar impacts are anticipated to occur during **Decommissioning**):

- TR1: Delays to other road users;
- TR2: Reduced road safety due to increased traffic volumes;
- TR3: Road degradation; and
- TR4: Reduced visibility due to increased dust.

7.13.2.1 Potential Impact TR1: Delays to Other Road Users

Overall traffic (trucks, buses, light vehicles) on certain road links will increase during the Construction and Decommissioning Phases. This may cause delays for other road users. The impact is assessed to be of **very low** significance with and without mitigation (Table 7-31).

Table 7-43: Significance of delays to other road users

Project phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	• Ensure that the traffic management plan (indicating stop-and-go activity, location of warning signs, possible detour routes, etc.) is approved by the project engineer and relevant local and provincial roads authorities; • Schedule deliveries so that heavy vehicles (HVs) and deliveries avoid local peak hours; • Plan and stagger abnormal vehicle (AV) trips to and from the site; and • Publish clear information (in local newspapers and/or appropriate WhatsApp groups) to the public regarding expected deliveries by AVs and risks associated with driving behind them.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between one and five years	Short term	Impact will last between one and five years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very Low	Natural and/ or social functions and/or processes are slightly altered	Very Low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	High	The affected environment will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on combined Renoster cluster	Should construction of all three WEFs and grid occur simultaneously; the traffic volumes will increase as will the congestion and delays experienced by motorists. However, the nature of the precautions will remain the same. The combined impact significance remains very low as the impacts can be mitigated. The congestion and delay from constructions traffic is deemed acceptable.			

7.13.2.2 Potential Impact TR2: Reduced Road Safety

There will be an increase in overall traffic during the Construction and Decommissioning Phases, which increases the likelihood of accidents. There will also be increase in the number of slow-moving heavy vehicles (HVs) and/or abnormally large vehicles (AVs), which may impede visibility for road users, which further affects road safety. The impact is assessed to be of **very low** significance with and without mitigation (Table 7-44).

Table 7-44: Significance of reduced road safety due to increased traffic volumes

Project phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	• Ensure that the traffic management plan (indicating stop-and-go activity, location of warning signs, possible detour routes, etc.) is approved by the project engineer and relevant local and provincial roads authorities; • Conduct regular traffic safety training for staff; • Post relevant (temporary) warning and information road signage along affected roads and routes; • Ensure that construction traffic/vehicles adhere to designated routes or access roads; • Ensure all drivers are licensed and competent and vehicles are maintained in good road-worthy condition; • Ensure AVs are adequately marked and operated by appropriately licenced operators; • Schedule deliveries to avoid local peak hours; and • Publish clear information (in local newspaper and/or appropriate WhatsApp groups) regarding expected deliveries by AVs and risks associated with driving behind them.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between one and five years	Short term	impact will last between one and five years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very Low	Natural and/or social functions and/or processes are slightly altered	Very Low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact

Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low – negative	
Comment on combined Renoster cluster	Should construction of all three WEFs and grid occur simultaneously; the traffic volumes will increase as will the risk of accidents; but the nature of the safety precautions remains the same. The combined impact significance remains very low .			

7.13.2.3 Potential Impact TR3: Road Degradation

During the Construction and Decommissioning Phases, the increased volume of HVs and AVs on the road network near the site will increase the rate of degradation of the road network. The impact is assessed to be of **medium** significance and with the implementation of mitigation is **low** (Table 7-45).

Table 7-45: Significance of road degradation

Project phase	Construction			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	- Conduct a pre-construction road condition assessment of the R34 and R720; - Establish a road inspection schedule that is agreed with by the relevant local and provincial roads authorities; - Maintain a photographic record of the condition of the roads at agreed intervals during the Construction Phase; - Upgrade and widen existing farm accesses to accommodate heavy and abnormal vehicles; - Ensure that the condition of the roads after construction is similar or better than pre-construction and consult with the relevant roads' authority to ensure any remedial work meets their standards; and - Ensure that a final inspection of the roads is conducted with relevant local and provincial roads authorities after construction.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Medium term	Impact will last between five and 10 years	Short term	impact will last between one and five years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very High	Natural and/or social functions and/or processes are majorly altered	Very Low	Natural and/or social functions and/or processes are slightly altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Almost certain/Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Medium - negative		Low - negative	

Comment on combined Renoster cluster	The construction traffic for all three WEFs will use the same roads, therefore the rate of degradation will increase. Consequently, the maintenance time and cost for the project will increase. Nevertheless, the combined impact significance remains low as impacts do not increase in severity and are reversible.

7.13.2.4 Potential Impact TR4: Increased Dust

HVs used for excavations and construction and decommissioning activities can generate dust that affects visibility along public roads. The R720 is particularly vulnerable to this impact as it is a gravel road. The impact is assessed to be of **low** significance and with the implementation of mitigation is **very low** (Table 7-46).

Table 7-46: Significance of increased dust on road safety

Project phase	Construction			
Mitigation Potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible Mitigation	• Ensure that construction vehicles travel at low speeds on site; • Employ dust suppression in the immediate vicinity of public roads; and • Regularly maintain internal haul roads (e.g. by means of re-gravelling and compaction).			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between one and five years	Short term	Impact will last between one and five years
Extent	Municipal area	Impacts felt at a municipal level	Limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/or social functions and/or processes are notably altered	Very Low	Natural and/or social functions and/ or processes are slightly altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	Dust generation during construction will increase. Consequently, dust suppression methods and costs will increase. Nevertheless, the combined impact remains very low with mitigation as impacts do not increase in severity and are reversible.			

7.13.3 Assessment of Impacts: Operational Phase

The following **Operational Phase** impact on traffic was identified:

- TR5: Reduced road safety due to increased traffic volumes.

7.13.3.1 Potential Impact TR5: Reduced Road Safety

Traffic volumes will increase marginally once the facility is operational (i.e. the facility will generate very low traffic volumes during operations). The impact is assessed to be of **very low** significance with and without mitigation (Table 7-47).

Table 7-47: Significance of reduced road safety due to increased traffic volumes

Project phase	Operational			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible Mitigation	Erect permanent warning and information signage at access gates and the minor roads.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Negligible	Natural and/or social functions and/ or processes are negligibly altered	Negligible	Natural and/or social functions and/or processes are negligibly altered
Probability	Rare/improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	Rare/improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Low	Judgement is based on intuition	Low	Judgement is based on intuition
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on combined Renoster cluster	The inclusion of traffic from the Renoster Wind Farm Development will not impact the volume:capacity ratio for the R34. The combined operation of all three WEFs will decrease the volume:capacity ratio of the roads but not below an acceptable level of service (LOS). The combined impact significance remains very low .			

7.13.4 Mitigation Measures: Potential Impacts on Traffic

Essential mitigation measures during **construction and decommissioning** are as follows:

- Ensure that the traffic management plan (indicating stop-and-go activity, location of warning signs, possible detour routes, etc.) is approved by the project engineer and relevant local and provincial roads authorities;
- Schedule deliveries so that HVs and deliveries avoid local peak hours;
- Plan and stagger AV trips to and from the site;

- Publish clear information (in local newspapers and/or appropriate WhatsApp groups) regarding expected deliveries by AVs and risks associated with driving behind them;
- Post relevant (temporary) warning and information road signage along affected roads and routes;
- Conduct regular traffic safety training for staff;
- Ensure that construction traffic/vehicles adhere to designated routes and access roads;
- Ensure all drivers are licensed and competent and vehicles are maintained in good road-worthy condition;
- Ensure AVs are adequately marked and operated by appropriately licenced operators;
- Conduct a pre-construction road condition assessment of the R34 and R720;
- Establish a road inspection schedule that is agreed by the relevant local and provincial roads authorities;
- Maintain a photographic record of the condition of the roads at agreed intervals during the Construction Phase;
- Upgrade and widen existing farm accesses to accommodate HV and AVs;
- Ensure that the condition of the roads after construction is similar or better than pre-construction and consult with the relevant roads authority to ensure any remedial work meets their standards;
- Ensure that a final inspection of the roads is conducted with relevant local and provincial roads authorities after construction;
- Ensure that construction vehicles travel at low speeds on site;
- Employ dust suppression measures in the immediate vicinity of public roads; and
- Regularly maintain internal haul roads (e.g. by means of re-gravelling and compaction).

Best practice mitigation measures during **construction/decommissioning** are as follows:

- Make contributions to the maintenance of the public roads, if acceptable to relevant roads authorities

Essential mitigation measures during **operations** are as follows:

- Erect permanent warning and information signage at access gates and the minor roads.

7.13.5 The No-Go Alternative

Assuming the No-Go alternative, additional traffic will not be generated and access does not need to be improved. However, the project was deemed acceptable from a traffic perspective (Zutari (Pty) Ltd, 2024).

7.13.6 Potential Cumulative Impacts

This cumulative impact assessment assumes that all current known, approved and authorised renewable energy projects within a 30 km radius of the site would be under construction at the same time. At the time of the preliminary traffic assessment, only one other renewable energy facility was approved within a 30 km radius of the Renoster Wind Farms project area.

At present, the R34 is considered to have additional capacity for 368 trips 'to Edenville' and 576 trips 'from Edenville' before the acceptable LOS is exceeded. A WEF of this size requires ~70 additional daily trips during the Construction Phase, so a total of five theoretical WEFs of the same magnitude

as the Renoster 1 Wind Farm could all be constructed simultaneously, use the same transport routes and have all construction trips occur in the same peak hour before the LOS becomes unacceptable. Operational Phase impacts for each renewable energy facility are **very low** and not be significant (Zutari (Pty) Ltd, 2024).

7.13.7 Impact Statement

From a traffic and transport point of view, there are no significant or irreversible impacts that cannot be addressed through application of the mitigation measures outlined above (see Section 7.13.4). Should these mitigation measures be applied as recommended, the authorisation for the Renoster 1 Wind Farm should not be refused on the basis of traffic and transport related impacts.

7.14 Potential Palaeontological Impacts

7.14.1 Introduction

Direct impacts on palaeontological resources would only occur during the Construction Phase through damage to, or destruction of, fossils in the immediate project footprint. This could occur during excavations for foundations for infrastructure and installation of underground cabling.

No impacts would occur in the operation or Decommissioning Phases.

This assessment is based on the Preliminary Palaeontology Specialist Assessment undertaken by Marion Bamford Consulting (see Appendix H12).

7.14.2 Terms of Reference

The ToR for the Palaeontology study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the Construction and Operational Phases, followed by a narrative description of each impact and a presentation of the impact assessment, using the prescribed impact rating methodology;
- Indicate the acceptability of alternatives and recommend a preferred alternative;
- Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

7.14.3 Methodology

The following was undertaken to execute the ToR:

- Consult geological maps, literature, palaeontological databases and records (published and unpublished) to determine the likelihood of fossils occurring in the study area;
- Visit the site to verify palaeontological site sensitivity, locate any fossils/fossil bearing rock and assess their importance;
- Collect any unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (where appropriate); and

- Determine the importance of any fossils discovered on site to ascertain whether fossils can be destroyed and/or if preservation of a representative sample is adequate.

7.14.4 Assessment of Potential: Construction Phase

The following potential direct **Construction Phase** impact on palaeontological heritage was identified:

- PA1: Damage to or loss of fossils.

7.14.4.1 Potential Impact PA1: Damage to or Loss of Fossils

Excavations for foundation for infrastructure, installation of underground cables and construction of access roads could destroy or damage fossils. The impact is assessed to be of **very low** significance and with the implementation of mitigation is a positive impact of **very low** significance (Table 7-48).

Table 7-48: Significance of damage to or loss of fossils

Project phase	Construction			
Mitigation Potential	Medium	Mitigation exists and will notably reduce significance of impacts		
Possible Mitigation	• Implement a Chance Finds Procedure as part of the Construction EMPr.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Immediate	Impact will self-remedy immediately
Extent	Very Limited	Limited to the site and its immediate surroundings	Very Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very Low	Natural and/or social functions and/or processes are slightly altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Highly unlikely/none	Expected never to happen
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - positive	

Comment on combined Renoster cluster	The combined impact of the three Renoster WEFs and grid connection on palaeontology will be confined to the immediate site (i.e. will not extend beyond the excavations), and the intensity of the impact will not increase at this scale. Therefore, the significance of the combined impact of the project (i.e. the three wind farms and the grid connection) is very low and is negligibly positive post mitigation because previously undiscovered fossils will be rescued.

7.14.5 Mitigation Measures: Potential Impacts on Palaeontology

Essential mitigation measures during **construction** are as follows:

- Implement a Chance Finds Procedure as part of the Construction EMP.

7.14.6 No-Go Alternative

As far as palaeontology is concerned, both the development and No-Go alternatives are equally preferred.

7.14.7 Cumulative Impacts

As no fossils were found in the Renoster 1 Wind Farm footprint nor are expected to be found, the project is not expected to contribute to any cumulative impact on palaeontology (Marion Bamford Consulting, 2024).

7.14.8 Impact Statement

The impact on the palaeontological heritage is **very low** significance pre-mitigation and **very low** positive significance post-mitigation (with mitigation being the proper removal of any fossils found in the excavations).

There are no No-Go areas; there are no buffers required; there are no fatal flaws and there is no cumulative impact.

As far as palaeontology is concerned, the Renoster 1 Wind Farm project can be authorised.

7.15 Potential Archaeological and Cultural Heritage Impacts

7.15.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Heritage Specialist Assessment undertaken by ASHA Consulting (Pty) Ltd (see Appendix H13). The purpose of the study was to assess the potential impacts of the project on heritage resources, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (ASHA Consulting (Pty) Ltd, 2024).

The ToR for the study were to:

- Describe regional and local features of the receiving environment;
- Conduct desktop research of heritage resources in the project area;
- Conduct a field survey to search for sensitive areas and sites of heritage significance;
- Map sensitive heritage features to inform the final project layout;
- Assess the potential impacts on identified heritage resources within a Heritage Impact Assessment (HIA) report that complied with the requirements of both the National Heritage Resources Act (No. 25 of 1999; NHRA) and Appendix 6 of the EIA Regulations, 2014, as amended;

- Identify relevant legislation and legal requirements; and
- Provide recommendations on possible mitigation measures and management guidelines.

Relevant literature was reviewed to assess the general heritage context of the project area. A field survey was conducted to groundtruth the presence of heritage resources in the area. The field survey focused on recording heritage resources in relation to the preliminary layout as well as trying to record any obvious heritage resources. Field surveys occurred as follows:

- 9-12 October 2023;
- 22 April 2024;
- 23-26 April 2024; and
- 29 April to 3 May 2024 (the author).

The standard impact rating methodology was then used to assess the impact of the project on heritage resources.

7.15.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** impacts on heritage resources were identified:

- HA1: Damage to or destruction of archaeological resources;
- HA2: Damage to or destruction of graves; and
- HA3: Alteration of and visual impact to prevailing rural/agricultural landscape.

7.15.2.1 Potential Impact HA1: Damage to or Destruction of Archaeological Resources

Archaeological resources may be damaged or destroyed during construction activities. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-49).

Table 7-49: Significance of damage to or destruction of archaeological resources

Project phase	Construction			
Mitigation potential	Medium	Mitigation exist and will notably reduce significance of impacts		
Possible mitigation	• Report any heritage sites found during development immediately; • Sample/record any heritage sites that will be impacted; • Move infrastructure to avoid heritage sites at waypoints 4372 and 4373, or mitigate these sites prior to construction; and • Survey any potentially sensitive heritage locations prior to construction if this is deemed necessary by an archaeologist.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Likely	The impact may occur	Rare/improbable	Conceivable, but only in extreme circumstances, and/or might occur for

				this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	Impact significance is expected to be low for all the projects combined.			

7.15.2.2 Potential Impact HA2: Damage to or Destruction of Graves

Graves may be damaged or destroyed during construction activities. The impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low** (Table 7-50).

Table 7-50: Significance of damage to or destruction of graves

Project phase	Construction			
Mitigation potential	High	Mitigation exists and will considerably reduce the significance of impacts		
Possible mitigation	• Avoid all graves during construction; and • Protect chance finds and report them to an archaeologist and/or SAHRA during construction.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Extremely high	Natural and/or social functions and/ or processes are severely altered	Moderate	Natural and/or social functions and/ or processes are moderately altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Rare/improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified

Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Very Low - negative	
Comment on combined Renoster cluster	Although graves are widespread, they are still fairly low density on the landscape which means the probability of impacts occurring are very low. The same rating would apply across all related projects and without any evidence that one area is more sensitive than another, the cumulative impacts would be similarly rated.			

7.15.2.3 Potential Impact HA3: Alteration of and Visual Impact to Prevailing Rural/Agricultural Landscape

The prevailing rural cultural landscape may be altered and impacted visually by construction activities. The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-51).

Table 7-51: Significance of alteration of and visual impact to prevailing landscape

Project phase	Construction			
Mitigation potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Position buildings, substations, laydown areas etc. in areas of low visibility as determined by the visual specialist; • Ensure that signage on public roads is of modest proportions; • Minimise the duration of construction as far as possible; and • Rehabilitate all areas not needed during operation.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium - negative		Low - negative	

Comment on combined Renoster cluster	The impacts will apply equally to the projects individually and to the cluster. However, if all the WEFs are constructed at the same time then there might be a slightly more intense impact. As the cluster will be seen as a single entity, it is unlikely that this would increase the overall impact significance.

7.15.3 Assessment of Potential Impacts: Operational Phase

The following potential direct Operational Phase impact on heritage resources was identified:

- HA4: Alteration of cultural landscape character.

7.15.3.1 Potential Impact HA4: Alteration of Cultural Landscape Character

The presence of the WEF in the rural landscape will alter the cultural landscape. The impact is assessed to be of **medium** significance with and without mitigation (Table 7-52).

Table 7-52: Significance of alteration of cultural landscape character

Project phase	Operational			
Mitigation potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Restrict all maintenance activities to the authorised project footprint; • Make use of visual mitigation such as motion detectors and downlighters; • Make use of an early warning system to allow aircraft navigation lights to remain off at night if permitted by the CAA; and • Ensure that signage on public roads is of modest proportions.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium - negative		Medium - negative	
Comment on combined Renoster cluster	The cluster will be seen as a single entity because of their spatial relationship. Therefore, the combined impacts will apply equally across the individual WEFs and the cluster.			

7.15.4 Assessment of Potential Impacts: Decommissioning Phase

The following potential direct Decommissioning Phase impact on heritage resources was identified:

- HA5: Alteration of and visual impact to prevailing rural/agricultural landscape.

7.15.4.1 Potential Impact HA5: Alteration of and Visual Impact to Prevailing Rural/Agricultural Landscape

The prevailing rural/cultural landscape may be altered and impacted visually by decommissioning activities. The impact is assessed to be of **medium** significance and with the implementation of mitigation is reduced to **low** (Table 7-53).

Table 7-53: Significance of alteration of and visual impact to prevailing landscape

Project phase	Decommissioning			
Mitigation potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Keep decommissioning duration as short as possible; • Ensure that signage on public roads is of modest proportions; and • Rehabilitate all areas not needed for post-decommissioning land use.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium - negative		Low - negative	
Comment on combined Renoster cluster	The impacts will apply equally to the projects individually and to the cluster. However, if all the WEFs are decommissioned at the same time then there might be a slightly more intense impact. As the cluster will be seen as a single entity, it is unlikely that this would increase the overall impact significance.			

7.15.5 Mitigation Measures: Potential Impacts on Heritage Resources

Essential mitigation measures during **construction** are as follows:

- Report any heritage sites found during development immediately;

- Sample/record any heritage sites that will be impacted;
- Move infrastructure to avoid heritage sites at waypoints 4372 and 4373, or mitigate these sites prior to construction;
- Survey any potentially sensitive heritage locations prior to construction if this is deemed necessary by an archaeologist;
- Avoid all graves during construction;
- Protect chance finds and report them to an archaeologist and/or SAHRA during construction;
- Position buildings, substations, laydown areas etc in areas of low visibility as determined by the visual specialist;
- Ensure that signage on public roads is of modest proportions;
- Minimise the duration of construction as far as possible; and
- Rehabilitate all areas not needed during operation.

Essential mitigation measures during **operations** are as follows:

- Restrict all maintenance activities to the authorised project footprint;
- Make use of visual mitigation such as motion detectors and downlighters;
- Make use of an early warning system to allow aircraft navigation lights to remain off at night if permitted by the CAA; and
- Ensure that signage on public roads is of modest proportions.

Essential mitigation measures during **decommissioning** are as follows:

- Keep decommissioning duration as short as possible;
- Ensure that signage on public roads is of modest proportions; and
- Rehabilitate all areas not needed for post-decommissioning land use.

7.15.6 The No-Go Alternative

Should the project not proceed (the No Go alternative is selected), existing low intensity, **low** significance impacts on archaeology and the rural landscape would persist. While the impact on heritage resources would be more significant if the project is authorised, the project would provide potential socio-economic benefits, a relevant consideration in terms of the NHRA. Therefore, from a heritage perspective the No-Go alternative is considered less desirable.

7.15.7 Potential Cumulative Impacts

Cumulative impacts on heritage resources are related to the cluster, a few existing HV powerlines, and the agricultural developments. It is generally the case that electrical installations occur far from occupied farmsteads, where the most significant heritage resources occur. Assuming that a moderate intensity cumulative impact might occur, the cumulative impact is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low**.

Cumulative impacts to graves are generally unlikely and is assessed to be of **low** significance and with the implementation of mitigation is reduced to **very low**.

Besides the HV powerlines in the west and the Sernick Facility, other large-scale renewable energy developments are not present or visible in the local landscape. Thus, cumulative impacts to the cultural landscape only relate to the other projects in the cluster. However, the cluster will be viewed as a single entity rather than as separate developments in different parts of the landscape. The cumulative impact on the cultural landscape is assessed to be of **medium** significance during **construction** and with the implementation of mitigation is reduced to **low**. During **operation**, the cumulative impacts are assessed to be of **medium** significance and remains the same with the implementation of mitigation. Cumulative impacts and mitigation during decommissioning are similar to the Construction Phase.

7.15.8 Impact Statement

Direct impacts on heritage resources will be minimal. Landscape impacts are unavoidable but not of high significance. From a heritage perspective, the project should be authorised in full, subject to recommendations by the heritage specialist.

7.15.9 Recommendations for the Impact Assessment Phase

The Final Heritage Specialist Assessment will consider and assess the revised WEF layout.

7.16 Potential Visual Impacts

7.16.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Preliminary Visual Specialist Assessment (see Appendix H14). The purpose of the study was to evaluate the potential visual impacts of the WEF on visual receptors and key vantage points at the site.

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area with reference to the visual environment, including existing impacts on the site, and place this in a regional context;
- Identify, describe and assess, using a prescribed impact rating methodology, each potential impact of the project, including impacts associated with the Construction and Operational Phases;
- Identify and describe potential cumulative impacts of the project in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

The visual character across much of the study area (the area within a 5 km radius of the Renoster 1 Wind Farm site - the maximum distance at which visual impacts are considered potentially significant) is mostly rural/pastoral and as such the proposed Renoster 1 Wind Farm and associated infrastructure will alter the visual character in the study area and increase the level of contrast with the surrounding landscape. However, urban development around the town of Edenville, as well as road and electricity infrastructure and commercial agricultural activity has already transformed the visual character of the study area to some degree. Edenville is not considered by the visual specialist to be sensitive because it is a built-up, heavily transformed area.

7.16.2 Assessment of Potential Impacts: Construction Phase

The following potential direct **Construction Phase** impact on the visual landscape was identified:

- VL1: Visual intrusion and alteration of sense of place.

7.16.2.1 Potential Impact VL1: Visual Intrusion and Alteration of Sense of Place

The following aspects are associated with visual intrusion and alteration of sense of place during the Construction Phase:

- Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction;
- Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings;
- Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact;
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers;
- Surface disturbance during construction will expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment; and
- Visual pollution can result from littering on the construction site.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-54).

Table 7-54: Significance of visual intrusion and alteration of sense of place

Project phase	Construction			
Mitigation potential	Low	Mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Avoid Visual No-Go areas when considering revisions to the WEF layout; • Minimise the construction period and avoid construction delays; • Restrict construction activities to daylight hours as far as possible; • Inform receptors within 1 km of the site of the construction programme and schedules; • Remove rubble, litter and waste from the construction site on a regular basis; • Position storage/stockpile areas in unobtrusive positions in the landscape, where possible; • Limit the number of vehicles and trucks travelling to and from the construction site, where possible; • Minimise the generation of dust as a result of construction activities; • Avoid removing vegetation until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; • Use existing servitudes and roads where possible to minimise further disturbance; and • Ensure that dust suppression techniques are implemented in all areas where vegetation clearing has taken place and on all access roads and soil stockpiles.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/or social functions and/or processes are moderately altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low – negative		Low - negative	
Comment on combined Renoster cluster	The combined Construction Phase visual intrusion and altered sense of place resulting from the three Renoster WEFs and Grid Infrastructure will extend across all three project areas and to nearby receptors, but the intensity of the impact will not increase. Therefore, the combined construction impacts of the three WEFs and the Grid Infrastructure will remain low post mitigation.			

7.16.3 Assessment of Potential Impacts: Operational Phase

The following potential direct **Operational Phase** impacts on the visual landscape were identified:

- VL2: Alteration of sense of place and landscape character;
- VL3: Visual intrusion; and
- VL4: Light pollution at night.

Potential Impact VL2: Alteration of Sense of Place and Landscape Character

Visual sensitivity is defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area, the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development. A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the visual sensitivity of the broader area is low. An important factor contributing to the visual sensitivity of an area is the presence, or absence, of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. In this instance the area is not typically valued for its tourism significance, there are no protected areas and relatively few sensitive receptor locations within 5 km of the proposed WEF development.

The primary thoroughfare in the study area is the R34 Main Road which bisects the study area linking Kroonstad in the south-west to Heilbron in the north-east. However, this road in conjunction with the R720 and several other minor thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

Notwithstanding the above, the project will contrast with the rural/pastoral landscape and alter the visual character and sense of place within the surrounding area, and few mitigation options exist to mitigate the visual impact of wind turbines

The impact is assessed to be of **medium** significance with and without mitigation (Table 7-55).

Table 7-55: Significance of alteration of sense of place and landscape character

Project phase	Operational	
Mitigation potential	Low	Mitigation will not reduce the significance of impacts but will prevent any increase in the negative impacts.

Possible mitigation	• Repair inoperative turbines, where feasible; • Replace turbines with turbines of similar height and scale, should they need to be replaced; • Consolidate O&M buildings, where possible; and • Use non-reflective surfaces, where possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/or social functions and/or processes are notably altered	High	Natural and/or social functions and/ or processes are notably altered
Probability	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium – negative		Medium - negative	
Comment on combined Renoster cluster	The combined impact on sense of place and landscape character resulting from the operation of the three Renoster WEFs and Grid Infrastructure will extend across all three project areas, but the intensity of the impact will not increase so the combined operational impacts remain <i>medium</i> post mitigation.			

7.16.3.1 Potential Impact VL3: Visual Intrusion

The project may be perceived as an unwelcome visual intrusion, particularly in more natural, undisturbed settings.

Of the 40 receptors and potential receptors located within or within 5km of the study area, 12 are not expected to be exposed to any visual impact, 27 are expected to be exposed to moderate and low visual impact, and one receptor will be exposed to high visual impacts. As this receptor is a contracted landowner to the development the impact is therefore considered tolerable by the visual specialist.

The impact is assessed to be of **medium** significance with and without mitigation (Table 7-56).

Table 7-56: Significance of visual intrusion

Project phase	Operational	
Mitigation potential	Low	Mitigation will not reduce the significance of impacts but will prevent any increase in the negative impacts.
Possible mitigation	- Repair inoperative turbines, where feasible; - Replace turbines with turbines of similar height and scale, should they need to be replaced; - Limit the number of maintenance vehicles accessing the site as far as possible; and - Use non-reflective surfaces, where possible.	
Assessment	Without mitigation	With mitigation
Nature	Negative	Negative

Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/or social functions and/ or processes are moderately altered	Moderate	Natural and/or social functions and/ or processes are moderately altered
Probability	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium – negative		Medium - negative	
Comment on combined Renoster cluster	The combined visual intrusion of the three Renoster WEFs and Grid Infrastructure will extend across all three project areas and to nearby receptors, but the intensity of the impact will not increase so the combined operational visual intrusion of will remain medium post mitigation.			

7.16.3.2 Potential Impact VL4: Light pollution at night

Potential light pollution at night will result from aircraft navigation lights on turbines and operational and security lighting within the project area. The impact is assessed to be of **medium** significance with and without mitigation (Table 7-57).

Table 7-57: Significance of light pollution at night

Project phase	Operational			
Mitigation potential	Low	Mitigation will slightly reduce the significance of impacts		
Possible mitigation	• Limit the amount of security and operational lighting present on site as far as possible while adhering to relevant safety standards; • Position light fittings for night time security to reflect light toward the ground; • Use minimum lumen or wattage lighting fixtures (whilst adhering to relevant safety standards); • Limit mounting heights of lighting fixtures or use foot-light or bollard level lights; and • Use motion detectors on security lighting, if possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Medium	Natural and/or social functions and/or processes are notably altered
Probability	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Medium – negative		Medium - negative	
Comment on combined Renoster cluster	The combined night-time visual impact of the three Renoster WEFs and Grid Infrastructure will extend across all three project areas and to nearby receptors, and although the intensity of the impact could potentially increase, the combined night-time impacts of the project will remain medium post mitigation.			

7.16.4 Assessment of Potential Impacts: Decommissioning Phase

The following potential direct **Decommissioning Phase** impact on visual landscape was identified:

- VL5: Visual intrusion and alteration of sense of place.

7.16.4.1 Potential Impact VL5: Visual Intrusion of Sense of Place

The following aspects are associated with visual intrusion and alteration of sense of place during the Decommissioning Phase:

- Vehicles and equipment required for decommissioning will alter the natural character of the site and expose visual receptors to visual intrusion;
- Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact;
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers;
- Surface disturbance during decommissioning would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment; and
- Decommissioned infrastructure left on the site may be visually intrusive.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-58).

Table 7-58: Significance of visual intrusion of sense of place

Project phase	Decommissioning	
Mitigation potential	Low	Mitigation will slightly reduce the significance of impacts

Possible mitigation	- Remove all infrastructure that is not required for post-decommissioning use; - Minimise the decommissioning period and plan to avoid delays; - Remove rubble, litter and waste from the decommissioning site regularly; - Position storage/stockpile areas in unobtrusive positions in the landscape, where possible. - Ensure that dust suppression procedures are maintained on all gravel access roads throughout the Decommissioning Phase; and - Rehabilitate all cleared areas as soon as possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/or social functions and/ or processes are moderately altered	Low	Natural and/or social functions and/ or processes are somewhat altered
Probability	Almost certain/Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low – negative		Low - negative	
Comment on combined Renoster cluster	The combined Decommissioning Phase visual impact of the three Renoster WEFs and Grid Infrastructure will extend across all three project areas and to nearby receptors, but the intensity of the impact will not increase so the combined impact will remain low post mitigation.			

7.16.5 Mitigation Measures: Potential Impacts on Visual Landscape

Essential mitigation measures during **construction** are as follows:

- Avoid Visual No-Go areas when revising the WEF layout;
- Minimise the construction period and avoid construction delays;
- Restrict construction activities to daylight hours as far as possible;
- Inform receptors within 1 km of the site of the construction programme and schedules;
- Remove rubble, litter and waste from the construction site on a regular basis;

- Position storage/stockpile areas in unobtrusive positions in the landscape, where possible;
- Limit the number of vehicles and trucks travelling to and from the construction site, where possible;
- Minimise the generation of dust as a result of construction activities;
- Avoid removing vegetation until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible;
- Use existing servitudes and roads where possible to minimise further disturbance; and
- Ensure that dust suppression techniques are implemented in all areas where vegetation clearing has taken place and on all access roads and soil stockpiles.

Essential mitigation measures during **operations** are as follows:

- Repair inoperative turbines, where feasible;
- Replace turbines with turbines of similar height and scale, should they need to be replaced;
- Consolidate O&M buildings, where possible;
- Use non-reflective surfaces, where possible;
- Limit the number of maintenance vehicles accessing the site as far as possible;
- Limit the amount of security and operational lighting present on site as far as possible whilst adhering to relevant safety standards;
- Position light fittings for nighttime security to reflect light toward the ground;
- Use minimum lumen or wattage lighting fixtures (whilst adhering to relevant safety standards);
- Limit mounting heights of lighting fixtures or use foot-light or bollard level lights; and
- Use motion detectors on security lighting, if possible.

Essential mitigation measures during **decommissioning** are as follows:

- Remove all infrastructure that is not required for post-decommissioning use;
- Minimise the decommissioning period and plan to avoid delays;
- Remove rubble, litter and waste from the decommissioning site regularly;
- Position storage/stockpile areas in unobtrusive positions in the landscape, where possible.
- Ensure that dust suppression procedures are maintained on all gravel access roads throughout the Decommissioning Phase; and
- Rehabilitate all cleared areas as soon as possible.

7.16.6 No-Go Alternative

From a Visual perspective, the No-Go alternative entails that the site would retain its visual character and sense of place. No visual impacts would be experienced by any locally occurring receptors.

7.16.7 Potential Cumulative Impacts

Considering the distance of other proposed renewable energy facilities from the site (>30 km), it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors within the site.

7.16.8 Impact Statement

Although the significance of visual impacts associated with the operation of the project are **medium**, the visual effects of the project on individual receptors have been assessed to be tolerable. Additionally, the visual sensitivity across the broader region is low. The impacts associated with the Construction, Operational and Decommissioning Phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

The project is deemed acceptable from a visual perspective.

7.16.9 Recommendations for the Impact Assessment Phase

The Preliminary Visual Impact Assessment has assessed the visual impacts of the project and no further field investigation will be required. The focus of the Impact Assessment Phase assessment will be to update the study based on:

- A review of the findings of the study in accordance with detailed site layouts; and
- Addressing any comments or concerns arising from the public participation process.

7.17 Potential Shadow Flicker Impacts

This assessment is based on the Preliminary Shadow Flicker Specialist Assessment undertaken by Metrica Environmental Consulting Ltd (see Appendix H15). The purpose of the study was to assess the potential impacts of the project on nearby potentially sensitive receptors, indicate its environmental acceptability and recommend practicable mitigation measures to minimise potential impacts and maximise potential benefits (Metrica Environmental Consulting Ltd, 2024).

The ToR for the study were to:

- Describe the existing baseline characteristics of the study area, including existing impacts on the site, and place this in a regional context;
- Identify and assess each potential impact of the project, including impacts associated with the Construction and Operational Phases, followed by a narrative description of each impact and a presentation of the assessment impact, using a prescribed impact rating methodology;
- Identify and describe potential cumulative impacts of the project in relation to proposed and existing developments in the surrounding area in the context of levels of acceptable change;
- Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and
- Recommend and draft a monitoring campaign, if applicable.

A recognised computer software package, Resoft WindFarm 5.1.1.4, was used to calculate theoretical specific times and durations of shadow flicker effects at specific locations. The software creates a mathematical model of the Development and its surroundings, based on:

- Turbine locations, hub height and rotor diameter;
- Topography; and
- Latitude and longitude of the proposed development site (to determine the position of the sun during the year).

A shadow flicker study area/radius of 2 400 m (i.e., 10 times the rotor diameter) from each proposed wind turbine was used to assess shadow flicker effects at nearby dwellings. A maximum hub height of 200 m and a rotor diameter of 240 m was used.

Impacts on receptors likely to receive less than 30 hours per annum or 30 minutes per day (the threshold above which shadow flicker impacts are considered significant) or those predicted to not experience shadow flicker are deemed negligible.

Since shadow flicker only occurs once the turbines will be operational, this assessment only considers the Operational Phase.

7.17.1 Assessment of Potential Impacts: Operational Phase

The following potential direct **Operational Phase** effects of shadow flicker on receptors were identified:

- SF1: Experience of shadow flicker

7.17.1.1 Potential Impact SF1: Experience of Shadow Flicker

In line with the precautionary approach, the shadow flicker modelling methodology included a number of hypothetical, worst-case assumptions, including:

- Weather conditions are such that shadows are always cast during each day of the year, i.e. bright sunshine every day;
- All receptors have windows on facades facing all four cardinal directions;
- The turbine rotor will always be facing directly towards a given window, maximising the size of the shadow and hence the frequency and duration of the effect (in reality, turbine rotors will move with the direction of the wind);
- The turbines will always be rotating; and
- There will be no intervening vegetation or structures (other than topography) that may restrict the visibility of a turbine from a receptor, preventing or reducing the effect – in this regard, many of the potentially sensitive receptors within the study area are surrounded by trees and other vegetation as well as uninhabited agricultural buildings, which will likely reduce or eliminate shadow flicker occurring in practice at these receptors.

These assumptions mean that the shadow-flicker model substantially overestimates the duration of effects in practice.

On the basis of these worst-case hypothetical assumptions, the outcomes of the shadow flicker model indicated that, 44 of the sensitive receptors analysed may experience shadow flicker for more than 30 hours per year or more than 30 minutes per day under theoretical maximum conditions – noting again that the actual potential exposure is likely to be only a fraction of the theoretical maximum.

The impact is assessed to be of **low** significance with and without mitigation (Table 7-59).

Table 7-59: Significance of experience of shadow flicker

Project phase	Operational	
Mitigation potential	High	Mitigation exists and will considerably reduce the significance of impacts
Possible mitigation	• Open and maintain complaints register; and • Investigate and respond to complaints relating to shadow flicker by shielding (blind, shutters, curtains or screening with vegetation), moving the affected window, or any other measure required to reduce the impact to tolerable levels.	
Assessment	Without mitigation	With mitigation
Nature	Negative	Negative

Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very Low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environment will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low – negative		Low - negative	
Comment on combined Renoster cluster	While combined impacts are likely to result in an additional four receptors exceeding the 30 hour per year/30 minutes per day threshold under theoretical maximum conditions, mitigation to minimise the impact remains readily available. As such the combined impact of cluster operating simultaneously will remain low post mitigation.			

7.17.2 Mitigation Measures: Potential Impacts of Shadow Flicker

Essential mitigation measures during **operations** are as follows:

- Open and maintain complaints register; and
- Investigate and respond to complaints relating to shadow flicker by shielding (blind, shutters, curtains or screening with vegetation), moving the affected window, or any other measure required to reduce the impact to tolerable levels.

7.17.3 Potential Cumulative Impacts

Other than the cluster, there are no approved renewable energy applications within 50 km of the project site. The cumulative impact assessed with therefore be limited to the combined impact of the three proposed WEFs – i.e. **low** significance.

7.17.4 Impact Statement

Following the implementation of appropriate mitigation, the overall impact is assessed to be of **low** significance for both Renoster 1 Wind Farm operating in isolation, and when considered collectively with Renoster 2 Wind Farm and Renoster 3 Wind Farm. From a shadow flicker perspective, there is no objection to grant the project environmental authorisation.

7.17.5 Recommendations for the Impact Assessment Phase

The Final Shadow Flicker Specialist Assessment will consider and assess the revised WEF layout.

7.18 Potential Greenhouse Gas Emissions and Climate Change Impacts

This assessment is based on the Climate Change Impact Statement for the Renoster Wind Farms Development undertaken by Promethium Carbon (see Appendix H16). The purpose of the study was

to provide an evaluation of the project's climate-related impacts by estimating GHG emissions for all phases of the project.

The ToR for the Climate Change Impact Statement were to:

- Conduct a LCA for GHG emissions from the project;
- Evaluate potential impacts on the project from climate change effects; and
- Provide an opinion on whether proposed activities should be authorised based on climate change impacts and risks.

The statement was based on a desktop calculation of all GHG emissions associated with the project throughout its lifecycle to estimate the project's net carbon footprint and associated impact on climate change.

7.18.1 Assessment of Potential Impacts: Construction Phase

The following potential direct impact on GHG emissions and climate change was identified for the **Construction Phase**:

- CC1: GHG emissions.

7.18.1.1 Potential Impact CC1: GHG Emissions

Prior to and during construction, GHG emissions will arise from the manufacturing of turbines, transportation of materials, personnel and equipment and other construction activities.

It is estimated that the project will lead to emissions of 0.2 Mt CO_{2e}, and that 90% of these emissions will occur during the Construction Phase (mainly from the production of wind farm components) – i.e. 0.18 Mt CO_{2e} during construction. Further, it is estimated that the project will reduce carbon stock by ~0.074 Mt CO_{2e} due to land use changes (see Table 2-4). In summary, it is estimated that, during construction, the project will result in the equivalent of 0.254 Mt CO_{2e} of GHG emissions over the two-year construction period, or 0.1127 Mt CO_{2e} per annum during construction.

In 2023, South African national GHG emissions equated to ~400 Mt CO_{2e} excluding losses to carbon stock from land use changes (Ritchie, Roser, & Rosado, 2020). Therefore, emissions from the project equate to 0.032% of total annual GHG emissions in South Africa per annum over the two-year construction period, a relatively minor contribution in the context of national emissions. The impact is assessed to be of **low** significance with and without mitigation (Table 7-60).

Table 7-60: Significance of GHG emissions

Project Phase	Construction			
Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential Mitigation	• Optimise logistics during construction where possible to minimise transportation-related emissions; and • Rehabilitate disturbed areas with locally indigenous vegetation.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	National	Impacts felt at a national level	National	Impacts felt at a national level

Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Certain/ definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Low - negative	
Comment on combined Renoster cluster	The above assessment pertains to the Renoster Wind Farms Development as a whole.			

7.18.2 Assessment of Potential Impacts: Operational Phase

The following potential direct impact on GHG emissions and climate change was identified for the **Operational Phase**:

- CC1: Avoidance of GHG emissions.

7.18.2.1 Potential Impact CC2: Avoidance of GHG Emissions

Wind energy development offers an opportunity to reduce South Africa's carbon footprint. While wind energy does have minimal lifecycle emissions, its primary benefit lies in avoiding the substantial CO_{2e}, emissions associated with conventional coal-fired power generation.

Under the conservative assumption that the project will have a nameplate generation capacity of 240 MW, it has been estimated that the project will result in the avoidance of 0.7 Mt CO_{2e} per annum when compared to the Eskom coal-fired power generation baseline. Over its 20-year project lifespan, this amounts to 14 Mt CO_{2e} (Promethium Carbon, 2024). When accounting for emissions during construction, the project will offset approximately 13.5 Mt CO_{2e} over its lifespan, equating to 6.3% of Eskom's carbon footprint in 2019, or 0.3% annually.

South Africa plans to decommission several coal-fired power stations as part of its commitment to a just energy transition. However, recent reports suggest that closures may be delayed to ensure energy security (Reuters, 2024). The deployment of renewables projects may facilitate the decommissioning of these coal plants by providing a reliable and cleaner alternative.

The impact is assessed to be of **high** significance. Enhancement is not necessary or possible (Table 7-61).

Table 7-61: Significance of avoidance of GHG emissions

Project Phase	Operational

Mitigation Potential	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential Mitigation	Not applicable.			
Assessment	Without mitigation		With mitigation	
Nature	Positive		Positive	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	National	Impacts felt at a national level	National	Impacts felt at a national level
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain/definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	High - positive		High - positive	
Comment on combined Renoster cluster	The above assessment pertains to the Renoster Wind Farms Development as a whole.			

7.18.3 Mitigation Measures: Potential Impacts on GHG Emissions and Climate Change

Essential mitigation measures during **construction** are as follows:

- Optimise logistics during construction where possible to minimise transportation-related emissions; and
- Rehabilitate disturbed areas with locally indigenous vegetation.

7.18.4 The No-Go Alternative

The No-Go Alternative involves leaving the site undeveloped, maintaining the status quo. While this avoids the emissions associated with manufacture/construction, it forfeits the opportunity to displace significant coal-based emissions. Additionally, the site would not contribute to South Africa's renewable energy targets, nor would it aid in reducing dependence on coal-fired power. The No-Go Alternative would result in a missed opportunity for advancing a just energy transition and is therefore not preferred from a GHG emissions/climate change perspective.

7.18.5 Potential Cumulative Impacts

The cumulative impact of the Renoster project together with other renewable energy developments in the area is considered to be of **high** positive significance.

7.18.6 Impact Statement

The project aligns with national goals for renewable energy generation and contributes to reducing the overall carbon footprint of South Africa's energy sector and is considered acceptable in the context of the broader benefits of transitioning to renewable energy. The project should be authorised, with conditions to ensure compliance with best practice in environmental protection and climate resilience.

8 Plan of Study for the EIA

The proposed Plan of Study for the Impact Assessment Phase of the EIA is presented below.

8.1 Description of the Proposed EIA Process

The Impact Assessment Phase can be divided into key steps, namely:

- Consultation with relevant authorities;
- Specialist studies;
- Compilation of an EIA Report and an EMPr;
- Stakeholder engagement; and
- Submission of the Final EIA Report and EMPr to the CA (in this case, DFFE).

These are outlined in more detail below.

8.2 Consultation with the Relevant Authorities

Relevant authorities will be consulted to clarify their requirements for the Impact Assessment Phase of the proposed project, other permit and licence applications for the project and to ensure that comments from the key authorities can be received in time to allow for them to be addressed in the EIA. The authorities (and other organs of state) that will be consulted include:

- DFFE;
- DESTEA;
- Department of Public Works and Infrastructure;
- South African National Roads Agency Limited (SANRAL);
- Department of Community Safety, Roads and Transport;
- DWS;
- DMRE/DMPR;
- Department of Agriculture, Land Reform and Rural Development;
- Eskom;
- National Energy Regulator of South Africa (NERSA);
- SAHRA;
- CAA;
- Air Traffic Navigation Services;
- South African Radio Astronomy Observatory;
- South African Weather Service;
- South African Local Government Association;
- TMDM;
- FDDM;
- Ngwathe LM; and

- Nketoana LM.

8.3 Specialist Studies

As noted in Chapter 4, the regulated timeframes for the formal S&EIR prescribed by NEMA commence on submission of an application for EA. However, because the formal S&EIR process is constrained by rigid timeframes, a significant portion of the detailed investigations required to inform layout and design has taken place prior to the commencement of the formal S&EIR process. Some specialist studies (e.g. Avifauna and Bats) require a 12-month monitoring period, which cannot be accommodated within the formal S&EIR process.

A summary of specialist studies that are being undertaken as part of the EIA, based on verification of sensitivities identified in the Screening Tool Report, is provided in Table 8-1. Specialist assessments based on the preliminary layout have been conducted and are presented in Appendix H.

Table 8-1: Site sensitivity verification and type of assessment undertaken

<u>Studies required in terms of the Screening Tool</u>	<u>Sensitivity of associated theme</u>		<u>Specialist Assessment</u>
	<u>Screening Tool</u>	<u>Specialist verification</u>	
<u>Agricultural Assessment</u>	<u>High</u>	<u>High</u>	<u>Impact Assessment</u>
<u>Aquatic Biodiversity Assessment</u>	<u>Very High</u>	<u>Very High</u>	<u>Impact Assessment</u>
<u>Terrestrial Biodiversity Assessment</u>	<u>Very High</u>	<u>Very High</u>	<u>Impact Assessment</u>
<u>Plant Species Assessment</u>	<u>Low</u>	<u>Low</u>	<u>Compliance Statement</u>
<u>Animal Species Assessment</u>	<u>High</u>	<u>High</u>	<u>Impact Assessment</u>
<u>Avifauna Assessment</u>	<u>Low</u>	<u>High</u>	<u>Impact Assessment</u>
<u>Bat Assessment</u>	<u>High</u>	<u>High</u>	<u>Impact Assessment</u>
<u>Socio-Economic Assessment</u>	<u>N/A</u>	<u>N/A</u>	<u>Impact Assessment</u>
<u>Archaeological and Cultural Heritage Assessment</u>	<u>Low</u>	<u>Very High</u>	<u>Impact Assessment</u>
<u>Palaeontology Assessment</u>	<u>Very High</u>	<u>Very Low</u>	<u>Impact Assessment</u>
<u>Landscape/Visual Assessment</u>	<u>Very High</u>	<u>Low</u>	<u>Impact Assessment</u>
<u>Flicker Assessment</u>	<u>Very High</u>	<u>Very High</u>	<u>Impact Assessment</u>
<u>Noise Assessment</u>	<u>Very High</u>	<u>Very High</u>	<u>Impact Assessment</u>
<u>Traffic Assessment</u>	<u>N/A</u>	<u>N/A</u>	<u>Impact Assessment</u>
<u>Geotechnical Assessment</u>	<u>N/A</u>	<u>N/A</u>	<u>No assessment required (see Section 8.3.2.2)</u>
<u>Civil Aviation Assessment</u>	<u>Low</u>	<u>Low</u>	<u>No assessment required (see Section 8.3.2.1)</u>
<u>Defence Assessment</u>	<u>Low</u>	<u>Low</u>	<u>No assessment required (see Section 8.3.2.1)</u>
<u>RFI Assessment</u>	<u>Medium</u>	<u>Low</u>	<u>No assessment required (see Section 8.3.2.1)</u>

Additional studies not specified in the Screening Tool Report that have been included in the EIA are listed in Table 8-2 below:

Table 8-2: Additional studies undertaken as part of the EIA

<u>Studies required in terms of the Screening Tool</u>	<u>Sensitivity of associated theme</u>		<u>Specialist assessment</u>
	<u>Screening Tool</u>	<u>Specialist verification</u>	
<u>Hydrogeological Assessment</u>	<u>N/A</u>	<u>N/A</u>	<u>Impact Assessment (see Section 8.3.1.1)</u>
<u>Socio-economic</u>	<u>N/A</u>	<u>N/A</u>	<u>Impact Assessment (see Section 8.3.1.2)</u>
<u>Climate Change</u>	<u>N/A</u>	<u>N/S</u>	<u>Impact Assessment (whole cluster) (see Section 8.3.1.3)</u>

Following the completion of the Scoping Phase, all specialist recommendations regarding the preliminary layout will be taken into consideration and a revised layout will be developed. During the Impact Assessment Phase, all specialists will update their studies based on this revised layout and as defined by their respective ToR (see Chapter 7). Where relevant, specialists will update their impact assessments and refine recommended mitigation measures to take any layout changes into account.

All specialists will be required to revisit their cumulative impact assessments based on the latest version of the DFFE Renewable Energy Environmental Authorisation database.

Collision Risk Modelling is being undertaken and will be included in the final Avifauna Specialist Assessment.

The full 12-month bat monitoring programme will be completed and the preliminary findings presented in the Scoping Report will be updated and refined.

8.3.1 Additional Specialist Assessments undertaken as part of the EIA process

Motivation for the inclusion of the following specialist studies in the EIA process that were not specified in the Screening Tool Report (Table 8-2) is set out below:

8.3.1.1 Hydrogeological Specialist Study

Although not specified as a required specialist study in the Screening Tool Report, specialist hydrogeological input into the EIA process is considered important given the reliance of the region on groundwater resources. In order to understand the potential impacts of the proposed project on the environment from a groundwater perspective and understand the availability of groundwater for the possible use during the construction, operational, and decommissioning phases of the project, a specialist hydrogeological investigation and impact assessment is being undertaken as part of the EIA process.

8.3.1.2 Socio-Economic Specialist Study

Although not specified as a required specialist study in the Screening Tool Report, specialist socio-economic input into the EIA process is considered vital. As such, a preliminary, desk-top Socio-Economic specialist study was completed to inform the Scoping Report. Following the conclusion of the stakeholder engagement process for the Scoping Phase, the Socio-Economic specialist will conduct a site visit and engage relevant stakeholders to inform this study. The assessment will consider impacts of the project focusing on the local and regional scales. Adverse and/or positive direct and indirect impacts will be identified for the Construction and Operational Phases. An assessment of the combined and cumulative impacts of all phases and aspects will also be provided.

The overall approach to the assessment of impacts is as follows:

- Review the need for, and economic desirability of the project, as well as the risks associated with the project, based primarily on information provided by Red Cap;
- Analyse alignment and compatibility of the project with key national, local and provincial economic and associated spatial development plans and relevant strategies, established through reviews of the relevant documentation in relation to the project augmented by interviews with key officials;
- Assess socio-economic impacts associated with project activities and expenditure on:
 - Local and regional economy based on key indicators such as employment and household incomes;
 - Upstream and downstream economic linkages and spin-offs;
 - Socio-economic and enterprise development contributions;
 - Overall socio-economic development potential in the area including impacts on other sectors and commercial enterprises nearby the site (e.g. agriculture, tourism⁴⁸ and other businesses);
 - Impacts identified in other specialist studies that have socio-economic implications, e.g. potential negative impacts on neighbouring landowners including changes to sense of place; and
 - Risk associated primarily with the presence of people from outside of the local community in the area.

Primary and secondary data sources that will be utilised to inform the assessment include:

- Stakeholder inputs on the Scoping Report;
- Data provided by Red Cap;
- Observations made during a field trip to site and the wider area;
- Meetings, telephonic interview and email correspondence with key stakeholders, stakeholder groups and persons with relevant local knowledge;
- Relevant literature and other studies focused on the impacts being considered;
- Planning and policy documents; and
- Findings of the other specialist studies forming part of the EIA to the extent that they are relevant.

Reporting will conform to specialist reporting requirements as outlined in Appendix 6 of NEMA.

8.3.1.3 Climate Change Specialist Study

Although not specified as a required specialist study in the Screening Tool Report, specialist climate change input into the EIA process is considered important. As such, a Climate Change Impact Statement has been included in the EIA process to provide an early-stage evaluation of the project's climate-related impacts, including an overview of GHG emissions and an estimation and qualitative assessment of the emissions generated during the project's lifecycle. Additionally, a preliminary evaluation of the project's impact on carbon stock, considering potential changes in land use and vegetation clearance is assessed. The assessment also includes an examination of the project's

⁴⁸ A detailed understanding of tourism in the area will be established and impacts assessed with reference to the findings of other specialist studies such as the Visual specialist study.

vulnerability and resilience to climate change, particularly its potential impact on local communities and their adaptive capacity.

8.3.2 Specialist Assessments not undertaken as part of the EIA process

8.3.2.1 Civil Aviation, Defence and RFI Specialist Studies

In the Screening Tool Report, Civil Aviation and Defence and Radio Frequency Interference (RFI) themes were rated as being of low sensitivity and Radio Frequency Interference was rated as being of high sensitivity. Motivation for the assessment of these themes by the EAP is set out below.

Feedback received from the SACAA during Scoping Phase consultation indicates that the proposed site is located outside the vicinity of aviation infrastructure and shows no indication of any major or negative impacts on aviation infrastructure or activities at the airport. However, the SACAA has suggested that a formal obstacle assessment may be required, which Red Cap will commission outside of the EIA process.

No comment has been obtained from the South African National Defence Force (SANDF) to date. Although there are no major defence installations within a large radius around the proposed cluster area, SRK will continue to attempt to obtain comment from the SANDF.

An extensive list of potential RFI-affected stakeholders was included in the Scoping Phase consultation and no such stakeholder has indicated any issue with the proposed project. These stakeholders will continue to be consulted in the EIA Phase.

Compliance statements will be compiled for all three of these themes in the EIA Phase.

8.3.2.2 Geotechnical Assessment

The Screening Tool Report stipulates that a geotechnical specialist assessment should be undertaken in the EIA. There are no underground mines or activities causing geotechnical instability within or close to the corridor. A geotechnical investigation will be undertaken by Red Cap to inform detailed design should an EA be issued for the project.

8.3.3 Wake Effect Assessment

In their comments on the Scoping Report, DFFE stipulated that a Wake Effect Assessment must be included as part of the specialist assessments conducted during the EIA phase, unless the EAP is of the view that this study is not required, in which case, clear motivation and reasons must be provided.

A Wake Effect Assessment is not considered necessary as there are no operational or approved wind farms that could be impacted by wake losses from the Renoster WEFs. Furthermore, the responsibility for assessing wake losses falls on developers proposing new projects in proximity to existing, authorised wind farms. Should applications for wind energy facilities be submitted after the Renoster 1 project has been granted EA, it will be incumbent on those applicants to assess their potential wake loss impacts on the Renoster 1 project and/or enter into wake loss agreements with the holders of the Renoster 1 Wind Farm EA.

Additionally, as part of the project's iterative design process, wind resource assessments were conducted to optimise turbine placement and minimise intra-project wake losses. This approach ensures the efficiency and viability of the projects without necessitating an external Wake Effect Assessment.

8.4 Assessment of Potential Cumulative Impacts

Potential cumulative impacts of the project will be assessed in the EIA Report. This will be based on inputs from specialists and the EAP's analysis. The following sections set out some background to the assessment of cumulative impacts and the approach that will be followed.

8.4.1 Introduction

Anthropogenic activities can result in numerous and complex effects on the natural and social environment. While many of these are direct and immediate, the environmental effects of individual activities (or projects) can combine (additive impact) and interact (synergistic impact) with other activities in time and space to cause incremental or aggregate effects. Effects from disparate activities may accumulate or interact to cause additional effects that may not be apparent when assessing the individual activities in isolation (Canadian Environmental Protection Agency, 2007). Cumulative effects can also be defined as the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time (DEAT IEM Guideline 7, Cumulative effects assessment, 2004). The International Finance Corporation (IFC, 1998) states that environmental assessment should include consideration of “... *cumulative impacts of existing projects, the proposed project and anticipated future projects*”.

The IFC's Good Practice Handbook for *Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets*, published in 2012, provides further guidance for comprehensive stand-alone Cumulative Impact Assessment (CIA) (IFC, 2012). It places further emphasis on biodiversity and socio-economic conditions and introduces the concept of Valued Environmental and Social Components (VECs).

The IFC recommends that cumulative assessment should (a) “*be commensurate with the incremental contribution, source, extent, and severity of the cumulative impacts anticipated,*” and (b) “*determine if the project is incrementally responsible for adversely affecting an ecosystem component or specific characteristic beyond an acceptable predetermined threshold (carrying capacity) ...*”

For the purposes of this report, cumulative impacts are defined as ‘direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors’.

To define the level of cumulative impact, it is critical to look beyond the geographical boundaries and environmental impacts of a single development/project and consider the area of influence of the specific project as well as other developments currently in or proposed in the area and their understood impacts and area of influence. It may be that impacts generated by a single development are not considered to be significant, but when considered as part of a cumulative impact assessment, these require mitigation.

Key considerations for the assessment of cumulative impacts as part of the environmental impact assessment are:

- The cumulative impact assessment will need to give consideration to developments that may have contributed to cumulative effects in the past, may be contributing or are anticipated to contribute in the foreseeable future. This needs to be relevant to the timeframe within which impacts are to be experienced as a result of the project itself (i.e. all phases for which the project specific impact assessment is being undertaken). Given that the baseline environment will already be impacted on by the historical and current contributors to the cumulative impact, it is only necessary when undertaking the cumulative impact assessment to place an emphasis on an identified future cumulative baseline environment;

- Cumulative impacts may not be applicable to all aspects, as project related impacts may be confined to the project area and not subject to or contributing to impacts in the broader area of influence as a whole. For example, if the project area is confined to a water catchment which is not anticipated to be impacted on by other developments (past, present or foreseeable future) then a cumulative impact assessment need not be considered for this environmental aspect;
- A cumulative impact assessment will consider a specific area of influence which will be determined by the impact itself and the baseline environment in which it is proposed; e.g. where one or more projects affect the same ecosystem, the whole area in which the ecosystem is found may be considered the area of influence for the cumulative assessment. This will vary across project aspects and therefore a single area of influence for the cumulative impact assessment cannot be set; and
- The cumulative impact assessment can only be undertaken where information is readily available and as such will only be an initial assessment of the likely cumulative impact in terms of knowledge available at the time of the assessment. It is critical to understand the information sources and limitations that exist.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed.

8.4.2 Scope of the Cumulative Assessment

For cumulative effects analysis to be a useful tool to decision makers and stakeholders, it must be limited to effects that can be meaningfully evaluated, rather than expanded to the point where the resource or receptors are no longer significantly affected or the effects are no longer of interest to stakeholders. To this end, four important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate area of influence, i.e. spatial and, to a lesser extent, temporal boundaries for evaluation of cumulative effects of the project;
- Identification of VECs;
- External natural and social stressors; and
- The evaluation of relevant projects for consideration in the cumulative effects analysis.

Each of the four aspects listed above is discussed below.

8.4.3 Area of Influence

The IFC (2012) defines the area of influence (Aoi) to encompass “*cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned, or reasonably defined developments at the time the risks and impact identification process is conducted.*” Consequently, the spatial and temporal boundaries for analysis of cumulative effects are dependent on a number of factors, including:

- The size and nature of the project and its potential effects;
- The size, nature and location of past and (known) future projects and activities in the area, and the significance of their adverse or beneficial environmental effects;
- Relevant ecological boundaries, including landform, vegetation, land use, habitat, soil and surface materials and climate;

- Relevant aquatic boundaries, including catchments, sub-catchments and hydrogeological discontinuities;
- The aspect of the environment impacted by the cumulative effect (boundaries selected for cumulative environmental effects on, for example, air quality might be different from those relevant to the effects on a particular species of plant or animal); and
- The period of occurrence of effects (temporal boundaries may extend beyond the timing of construction and operations) (Canadian Environmental Protection Agency, 2007).
- The AoI does not include potential impacts that would occur without the project or independently of the project.
- Areas potentially impacted by the project and project facilities which are directly owned, operated, or managed by the proponent (or contractors);
- Areas potentially impacted by unplanned but predictable developments caused by the project that may occur later or at a different location
- Affected communities whose livelihoods are affected by indirect project impacts on biodiversity or ecosystems;
- Areas potentially impacted by cumulative impacts from additional planned development or other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that can realistically be foreseen; and
- Areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.

The AoI has been taken as the area within 30 km radius of the project, covering ~2 830 km², which is sufficiently large to capture cumulative impacts on ecosystems and sufficiently small to experience cumulative impacts.

8.4.4 Identification of VECs

VECs are environmental and social attributes that are considered to be important in assessing risks; they may be: physical features, habitats, wildlife populations (e.g. biodiversity), ecosystem services, natural processes (e.g. water and nutrient cycles, microclimate), social conditions (e.g. health, economics) or cultural aspects (e.g. traditional spiritual ceremonies).

While VECs may be directly or indirectly affected by a specific development, they often are also affected by the cumulative effects of several developments. VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways.

VECs for this project were selected based on an understanding of the project activities, the vulnerability/sensitivity of the receiving environment; and the potential interactions between project activities and the biophysical, i.e. soil resources, freshwater and terrestrial ecology, fauna, and socioeconomic environment, i.e. social receptors (communities).

8.4.5 External Natural and Social Stressors

Natural and social stressors can also contribute to cumulative impacts. The major ongoing stressors in the area of influence include:

- Grazing and cultivation, affecting the function and composition of habitats and faunal communities; and
- Droughts.

8.4.6 Past, Existing and Planned Activities that may affect VECs

In addition to the project, other past, present and future activities might have caused or may cause impacts and may interact with impacts caused by the project under review.

- **Cumulative impacts of past and existing activities:** It is reasonably straightforward to identify significant past and present projects and activities that may interact with the project to produce cumulative impacts. These are taken into account in the descriptions of the biophysical and socio-economic baseline (see respective sections in Chapter 6).
- **Potential cumulative impacts of planned and foreseen activities:** Relevant future projects that will be included in the assessment are defined as those that are 'reasonably foreseeable', i.e. those that have a high probability of implementation in the foreseeable future; speculation is not sufficient reason for inclusion. Such projects may include those for which authorisations have already been granted, that are currently subject to environmental assessment processes or that have been identified in planning documents.

8.4.7 Cumulative Impacts Analysis

The IFC (2012) defines CIA as a process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen VECs over time, and (b) proposing tangible measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. The key task is to ascertain how the potential impacts of a proposed development might combine, cumulatively, with the potential impacts of the other human activities and other natural stressors such as droughts or extreme climatic events.

For the most part, cumulative impacts or aspects are too uncertain to be quantifiable, mainly due to lack of (accurate) data. This is particularly true of cumulative impacts arising from potential or future projects.

8.5 Analysis of Need and Desirability of the Project

Best practice as well as the EIA Regulations, 2014 (Appendix 3 Section 3 [f]) require that the need and desirability of a project (including viable alternatives) are considered and evaluated against the tenets of sustainability. This requires an analysis of the effect of the project on *social, economic and ecological* systems; and places emphasis on consideration of a project's *justification* not only in terms of financial viability (which is often implicit in a [private] proponent's intention to implement the project), but also in terms of the specific needs and interests of the community and the opportunity cost of development (DEA&DP, 2013).

The principles in NEMA (see Section 3.1.1) serve as a guide for the interpretation of the issue of "need", but do not conceive "need" as synonymous with the "general purpose and requirements" of the project. The latter might relate to the applicant's project motivation, while the "need" relates to the interests and needs of the broader public. In this regard, an important NEMA principle is that environmental management must ensure that the environment is "held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage" (DEA, 2014).

There are various proxies for assessing the need and desirability of a project, notably national and regional planning documents which enunciate the strategic needs and desires of broader society and communities: project alignment with these documents must therefore be considered and reported on in the EIA process. With the use of these documents or - where these planning documents are not available - using best judgement, the EAPs (and specialists) must consider the project's strategic context, or justification, in terms of the needs and interests of the broader community (DEA&DP, 2013).

The consideration of need and desirability in EIA decision-making therefore requires the consideration of the strategic context of the project along with broader societal needs and the public interest (DEA, 2014). However, it is important to note that projects which deviate from strategic plans are not necessarily undesirable. The DEA notes that more important are the social, economic and ecological impacts of the deviation, and “the burden of proof falls on the applicant (and the EAP) to show why the impacts...might be justifiable” (DEA, 2014).

8.5.1 Alignment with Planning Policy

The development aligns with national, provincial and local policy and planning frameworks in that:

- It will significantly contribute towards South Africa's targets for the development of new wind energy sources;
- It is associated with tolerable ecological impacts within well represented habitat types that have been subject to historical and ongoing degradation in an environment that is not of particular cultural significance or a recognised tourist destination; and
- It will deliver significant local investment and employment in an economically strained rural environment (see Table 8-3).

Table 8-3: Analysis of project consistency with relevant plans and policies

Policy	Compliance	Discussion
Integrated Resource Plan, 2024	Compliant	The project would contribute to the goal of installing up to 38 GW of new energy sources, including 7.2 GW of wind energy sources
Strategic Integrated Projects	Compliant	The project is compliant with SIP 8, as it relates to the industrial-scale generation of sustainable green energy, SIP 9, as it provides new energy generation capacity, and SIP 10, as it includes infrastructure for the expansion of the electricity transmission network.
Free State Provincial Growth and Development Strategy	Compliant	The project aligns with the FSPGDS by promoting economic growth, sustainable job creation, and rural development, which are core pillars of the strategy. The project will contribute to addressing unemployment and poverty in the province through job creation during both the Construction and Operational Phases, which is particularly important in rural areas where economic opportunities are often limited. Additionally, the development of renewable energy infrastructure supports the province's Vision 2030 goal of diversifying the economy into knowledge-based and green industries, reducing reliance on traditional sectors such as mining and agriculture.
Free State Provincial Spatial Development Framework – Spatial Challenges and Opportunities 23/24	Compliant	The FSPSDF emphasises sustainable land use and strategic resource management to stimulate economic growth, particularly in rural areas. Key development levers include improving infrastructure, utilising resources sustainably, and supporting emerging markets like renewable energy. The project aligns with the FSPSDF by contributing to sustainable rural development, creating jobs, and supporting the province's transition to a green economy. The FSPSDF emphasises the sustainable use of ecological resources, minimisation of ecological degradation and the rehabilitation of damaged waterways. Through careful site selection and a commitment to improve at least one aspect of watercourse impact at upgraded watercourse crossings, the project aligns with these principles.
Free State Province Biodiversity Spatial Plan (2024)	Compliant	This plan discourages development within CBAs and indicates that ESAs must be maintained “in at least fair ecological condition (semi-natural/moderately modified state)”. Project infrastructure will not be located within any CBAs but will have limited impacts in ESAs, some of which have already been transformed. The project is therefore

Policy	Compliance	Discussion
		unlikely to further affect the ecological functioning of these ESAs, and wind energy developments do not necessarily preclude certain forms of formal land protection.
Fezile Dabi District Municipality Integrated Development Plan (2022 – 2027)	Compliant	The project aligns with the FDDM IDP by contributing to local economic growth, enhancing municipal revenue and supporting basic service delivery through private sector investment in renewable energy. By developing a large WEF, the project will create employment opportunities, stimulate local economies and strengthen municipal finances through rates, taxes, and infrastructure investments.

8.5.2 Socio-Economic Need and Desirability

At a local level, the Renoster 1 Wind Farm project is desirable given the significant need for economic growth and employment in the region. The region is characterised by relatively high unemployment and poverty, with limited access to sustainable economic opportunities (Van Zyl, 2024). The project will contribute to job creation, both during the Construction and Operational Phases, and provide opportunities for local procurement and skills development. Additionally, through Corporate Social Investment initiatives, the project could provide long-term financial or other benefits to local communities, further supporting socio-economic development priorities outlined in local municipal and provincial IDPs.

At a national level, the project aligns with South Africa's pressing need to increase renewable energy capacity to reduce the country's reliance on fossil fuels. The project's proximity to transmission infrastructure with available capacity means that it can be connected to the national grid without significant upgrades.

8.5.3 Ecological Need and Desirability

It is essential that the implementation of social and economic policies take cognisance of strategic ecological concerns such as climate change, food security, as well as the sustainability in supply (and utilisation) of natural resources and the status of ecosystem services. Sustainable development is the process followed to achieve the goal of sustainability (DEA, 2014).

Sustainable development implies that a project should not compromise natural systems. In this regard, the Best Practicable Environmental Option (BPEO) is that which provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term.

NEMA and the EIA Regulations, 2014 call for a hierarchical approach to the selection of development options, as well as impact management, which includes the investigation of alternatives to avoid, reduce (mitigate and manage) and/or remediate (rehabilitate and restore) negative (ecological) impacts (DEA, 2014).

The proposed project is not without ecological impacts, the most notable being its potential effects on avifauna, bats and terrestrial ecosystems (mainly through habitat fragmentation and degradation, particularly in areas classified as ESAs). While potential avifaunal impacts of the proposed project are a key consideration, the project area is not uniquely sensitive from an avifaunal perspective, nor does the project area have any characteristics that make it more sensitive than other areas in the broader region. Furthermore, the project represents some (limited) opportunities for ecological improvement, particularly through improving watercourse crossings and resultant erosion. In this context, the project's ecological impacts are considered acceptable within the framework of the BPEO and with the application of best practice and cutting-edge mitigation.

Additionally, the footprint of a WEF is relatively small compared with other forms of development and a WEF does not entirely preclude other concurrent land uses, including some level of habitat conservation.

From a broader perspective, the project conforms with the BPEO by providing long-term environmental benefits, including contributing to the global effort to combat climate change. Climate change is a key driver of biodiversity loss. As a low-carbon energy source, the project plays an important role in reducing the country's reliance on fossil fuels, aligning with national and international climate goals.

8.5.4 Summary of Need and Desirability

In summary:

- The project aligns with several socio-economic principles and policies outlined in local, provincial, and national planning frameworks by providing additional renewable, low-emission electricity to the national grid;
- The project will create jobs and provide economic stimulus in a rural area with high unemployment and limited economic opportunities. The project will generate direct and indirect local employment and create opportunities for local procurement and community development;
- The project area partially overlaps with areas classified as ESAs and NPAES focus areas. However, the site itself does not possess unique sensitivities and the project's impacts on natural ecosystems are considered acceptable with the application of recommended mitigation measures;
- The project will contribute to climate change mitigation, which ultimately reduces biodiversity loss in the long term. The project conforms with the BPEO by balancing acceptable ecological impacts with significant long-term environmental and societal benefits;
- The project footprint is relatively small compared with other forms of development, and avifaunal and bat impacts – typically key concerns for wind farms – are deemed acceptable within the broader environmental context; and
- Social, economic, and ecological factors have been carefully considered and assessed to ensure that the project is sustainable. With mitigation applied, the project is deemed both socio-economically and ecologically desirable.

8.6 Compilation of the Environmental Impact Assessment Report

The compilation of the EIA Report and EMPs will include the following tasks:

- Assimilation of the revised specialist studies/input into the EIA Report and EMPs;
- Identification and assessment of environmental impacts based on the results of the specialist studies/input and professional judgement of the EIA team (see Section 7.2);
- Identification of mitigation measures and recommendations for the management of the proposed project to avoid and minimise environmental impacts and maximise benefits;
- Assessment of the No-Go alternative, which entails no change to the status quo, in other words the proposed project will not proceed and no WEF, substations and powerlines will be built; and
- Collation of the above information into an EIA Report and EMPs for the Construction and Operational Phases of the project.

8.7 Stakeholder Engagement

The stakeholder engagement process initiated during the Scoping Phase (see Section 5.2) will continue in the Impact Assessment Phase of the EIA. The key activities planned during the Impact Assessment Phase are outlined in Table 8-4.

Table 8-4: Stakeholder engagement activities planned during the Impact Assessment Phase

Task	Objectives	Dates/Timeframe
Update stakeholder database	To register additional stakeholders identified throughout the S&EIR process	Throughout S&EIR process
Compile and release EIA Report for public comment period	To assess the impacts of the project and formulate mitigation measures and management plans.	Impact Assessment Phase
Public comment period	To provide stakeholders with the opportunity to review and comment on the results of the Impact Assessment Phase.	Impact Assessment Phase
Finalise EIA Report	To present the findings of the EIA process and incorporate stakeholder comment in the final report which provides DFFE with information for decision-making.	Impact Assessment Phase
Release Final EIA Report for public review	To provide stakeholders with the opportunity to review responses to comments changes to the EIA Report (if any).	At submission of EIA Report to DFFE

8.8 Submission of the Final EIA Report

Comments received during public review of the EIA report will be incorporated into an Issues and Responses Summary which will be appended to the Final EIA Report. The Final EIA Report (including the EMPs) will then be released to stakeholders for information and submitted to DFFE to inform their decision regarding EA of the proposed development.

9 Conclusions

In order to apply for EA for the Renoster 1 Wind Farm and associated infrastructure, an S&EIR process is being undertaken in terms of the EIA Regulations, 2014, promulgated in terms of NEMA. The Scoping Study was the first (formal) phase of this process. The conclusions of the Scoping Study and recommendations as to the way forward are as summarised below.

9.1 Conclusions

Red Cap initially selected an extensive area for investigation predicated on the favourable wind resource in the area and access to grid transmission lines. The comprehensive, iterative design process undertaken to refine a preliminary layout of the Renoster 1 Wind Farm and associated grid connection infrastructure reduced the project site to ~13 000 ha on 56 properties. This process has integrated environmental and social sensitivities with technical design from early in the project lifecycle to reduce risk and ensure that measures to avoid and minimise potential impacts have been incorporated the design progression.

Because the formal S&EIR process is constrained by rigid timeframes, a significant portion of the detailed environmental investigations required to inform layout and design has taken place prior to the commencement of the formal S&EIR process. As a result, this *Final* Scoping Report presents detailed preliminary specialist studies and assessments of the preliminary layout. Through this process of iterative design, most of the key sensitivities and potential impacts have been avoided, but further layout and design modifications will be implemented based on feedback received during public participation, recommendations in the preliminary specialist assessments and implications of finalised specialist monitoring data and analysis.

The receiving environment of the project area is characterised by flat plains and low rolling hills and is largely rural and agricultural in nature. Cattle farming and dryland cereal cropping (mainly maize, sunflower and soya) are the predominant land use, with the small town of Edenville serving the surrounding farming community. Although wind farms are generally spread across extensive areas, their actual footprints are relatively small – in this case, the Renoster 1 Wind Farm would occupy less the 2% of the project area (171 ha of temporary disturbance during construction and 149 ha permanent footprint).

Overall, the preliminary assessment has not identified any fatal flaws or any additional studies required to inform the EIA. The combined impacts of the three proposed Renoster WEFs and associated grid infrastructure have been considered and although some of the combined impacts are considered to be of **medium** significance, these are not unacceptable particularly in the context of the potential benefits of the project.

9.2 Way Forward

The public participation process conducted to date has provided stakeholders the opportunity to assist with the identification of issues and potential impacts and to submit their comments. Comments received during the Scoping Phase have been incorporated into this Final Scoping Report, which is now being submitted to DFFE. All submissions and comments received will inform in the Impact Assessment phase.

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional environmental practices.

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Appendices

Appendix A:

Curriculum Vitae of the EAPs and Signed Declarations

Appendix B: Farm Properties and Portions

Appendix C: Site Sensitivity Verification Report

Appendix D: Stakeholder Notifications

Appendix D1:
Pre-Application Phase Stakeholder Notifications

Appendix D2:
Scoping Phase Stakeholder Notifications

Appendix E:

Background Information Document

Appendix F: Stakeholder Database

Appendix G:
Written Comments from Stakeholders and
Issues and Responses Summary

Appendix G1:

Issues and Responses Summary (Pre-Application Phase)

Appendix G2:
Issues and Responses Summary (Scoping Phase)

Appendix G3:
Comments Received (Scoping Phase)

Appendix H: Preliminary Specialist Studies

Appendix H1: Geohydrology Specialist Study

Appendix H2:

Preliminary Agriculture Specialist Study

Appendix H3:

Preliminary Aquatic Ecology Specialist Study

Appendix H4:

Preliminary Terrestrial Ecology Specialist Study

Appendix H5:

Preliminary Plant Species Specialist Study

Appendix H6: Preliminary Animal Species Specialist Study

Appendix H7: Preliminary Avifauna Specialist Study

Appendix H8: Preliminary Bats Specialist Study

Appendix H9: Preliminary Socio-Economic Specialist Study

Appendix H10: Preliminary Palaeontology Specialist Study

Appendix H11: Preliminary Archaeology and Heritage Specialist Study

Appendix H12: Preliminary Visual and Landscape Specialist Study

Appendix H13: Preliminary Shadow Flicker Specialist Study

Appendix H14: Preliminary Noise Specialist Study

Appendix H15: Preliminary Traffic and Transport Specialist Study

Appendix H16: Preliminary Climate Change Specialist Study