



Environmental Impact Assessment Process for the Proposed Khoe Wind Energy Facility near De Doorns, Western Cape

Draft Scoping Report

February 2024

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Draft Scoping Report



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PROJECT DETAILS

DFFE Reference	TBC		
ERM Reference	0695823		
Project Title	Scoping Report for Khoe WEF		
EAP	Khosi Ngema		
Specialist Team	Specialist	Specialist Study	Organisation
	Soil, Land Use and Agricultural Potential	Johann Lanz	Independent Consultant
	Heritage and Palaeontology	John Gribble	TerraMare Archaeology
	Noise	Mornè De Jager	Enviro Acoustic Research
	Visual/ Landscape	Lourens du Plessis	LOGIS
	Traffic	Victor de Abreu and Reabetswe Mokomele	SMEC
	Biodiversity	Owen Davies and Juan Swanepoel	ERM
	Socio-Economic	Tony Barbour	Independent Consultant
	Avifauna	Dr Rob Simmons	Birds and Bats Unlimited
	Bats	Stephanie Dippenaar	Stephanie Dippenaar Consulting trading as EkoVler
	Freshwater and Wetlands (Aquatics)	Dr Brian Colloty	EnviroSci
Project Applicant	FE Hugo & Khoe (Pty) Ltd		
Report Status	Draft		

ABBREVIATIONS, ACRONYMS AND UNITS

BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
dB	Decibel
DFFE	Department of Forestry, Fisheries and the Environment (National)
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
LM	Local Municipality
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt

NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Protected Area Expansion Strategy
NSD	Noise-sensitive Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OES	Ostrich Eggshell
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PPA	Power Purchase Agreement
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMPPP	Risk Mitigation Power Procurement Programme
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAWS	South African Weather Service
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SR	Scoping Report
SPV	Special Purpose Vehicle
WEF	Wind Energy Facility
WULA	Water Use License Application

EXECUTIVE SUMMARY

The FE Hugo & Khoe (Pty) Ltd ('the Project Applicant') is applying for environmental authorisation to construct and operate the up to 290 MW Khoe Wind Energy Facility (WEF). Additional ancillary infrastructure to the WEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), foundations to support turbine towers, internal/ access roads linking the wind turbines and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) ('the proposed development'). Environmental Resource Management Southern Africa (Pty) Ltd ('ERM') has been appointed by FE Hugo & Khoe (Pty) Ltd to act as the independent environmental impact assessment practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for Environmental Authorisation under Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 - NEMA) as amended, for the Proposed Development.

FE Hugo and Khoe also proposed to develop and operate the Hugo WEF, which is situated approximately 13 km north west of the Khoe WEF. The Hugo WEF will form part of a separate application process. However, it will run parallel to the Khoe WEF application process. As such, this report is strictly pertaining to the development and operation of the proposed Khoe WEF.

It is important to note that the grid connection will not form part of this S&EIA process. It will however, be assessed in a separate application process at a later stage.

SITE LOCATION AND PROPOSED DEVELOPMENT DESCRIPTION

The proposed Khoe WEF is located near De Doorns within the Langeberg Local Municipality in the Western Cape Province.

The Khoe WEF project site is proposed to accommodate infrastructure (as detailed below), which will enable the WEF to supply a contracted capacity of up to 290 MW. The development footprint of the site will be up to 85 ha, dependent on the sensitivities in the area. The proposed development will comprise of the following infrastructure:

- Up to 38 wind turbines with a maximum tip height of up to 250 m and a rotor diameter of up to 200 m.
- Each turbine will have a capacity of up to 7.5MW
- A transformer at the base of each turbine.
- Concrete turbine foundations approximately up to 1000m² per turbine
- Each turbine will have a hardstand area of approximately up to 7500m² per turbine
- Temporary laydown areas (with a footprint of up to 9 ha) which will accommodate the boom erection, storage and assembly area.
- Battery Energy Storage System (BESS) (with a footprint of up to approximately 5 ha).
- Cabling between the turbines, to be laid underground where practical.
- One on-site substations of up to 2.5 ha in extent to facilitate the connection between the WEF and the electricity grid.
- Access roads to the site and between project components inclusive of stormwater infrastructure. A 13.5 m road corridor may be temporarily impacted upon during construction and rehabilitated to 8m wide after construction.

- A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha).
- Operation and Maintenance (O&M) buildings (with a combined footprint of up to 1 ha) including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre.

The project is expected to have a 20-25-year life span, but with possible refurbishment this could be extended if deemed feasible at the time.

ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The EIA Regulations 2014 published in Government Notice (GN) No. R. 982 as amended provide for the control of certain Listed Activities. These activities are listed in GN No. R. 983 (Listing Notice 1 - Basic Assessment), R. 984 (Listing Notice 2 - Scoping & EIA Process) and R. 985 (Listing Notice 3 - Basic Assessment) of 4 December and are prohibited to proceed until environmental authorisation has been obtained from the competent authority, in this case, the Department of Environment, Forestry and Fisheries (DFFE).

On 7 April 2017 in Government Gazette 40772 the Minister of Environmental Affairs published amendments in Government Notice (GN) Number R. 326 to the Environmental Impact Assessment (EIA) Regulations of 2014 that provide for the control of certain Listed Activities. These activities are listed in Listing Notice 1 (GN R327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324). Activities triggered within Listing Notice 1 and 3 require Basic Assessment; activities within Listing Notice 2 require a Scoping & EIA Process.

As the proposed Khoe WEF and associated infrastructure triggers Activities in Listing Notices 1 - 3 and does not fall within a Renewable Energy Development Zone (REDZ), a full Scoping and EIA (S&EIA) process is being followed.

Listed Activities applicable to the proposed Khoe WEF and associated infrastructure are presented in the table below. All potential impacts associated with these Listed Activities will be considered and assessed in this S&EIA process.

APPLICABLE LISTED ACTIVITIES IN TERMS OF THE NEMA, AS AMENDED

Listing Notice	Activities
LN 1 GN R327 ¹	11(i); 12 (ii, a, c); 14; 19 (i); 24 (ii); 28 (ii); and 56 (i)(ii).
LN 2 GN R325 ²	1; and 15.
LN 3 GN R324 ³	4 (i)(ii)(aa); and 18(i)(ii) (aa)

¹ "Listing Notice 1 of the EIA Regulations, promulgated under Government Notice R983 of 4 December 2014, as amended by Government Notice R327 of 7 April 2017."

² "Listing Notice 2 of the EIA Regulations, promulgated under Government Notice R984 of 4 December 2014, as amended by Government Notice R325 of 7 April 2017."

³ "Listing Notice 3 of the EIA Regulations, promulgated under Government Notice R985 of 4 December 2014, as amended by Government Notice R324 of 7 April 2017."

Depending on the final design of the Khoe WEF and associated infrastructure, there may be a requirement for the following additional permits / authorisations:

- Biodiversity Permits in terms of the National Environmental Management: Biodiversity Act (Act No 10 of 2004) (NEMBA);
- Waste Management License/s as required by the NEMA, Waste Act, 2008 (Act No. 59 of 2008);
- Water Use Licenses as required by the National Water Act, 1998 (Act No. 36 of 1998) (NWA); and
- Heritage License in term of the National Heritage Resources Act 25 of 1999.

Where applicable, these permits will be applied for should the project be authorised and be selected as a preferred bidder.

AREAS OF INITIAL INVESTIGATION

A number of initial specialist investigations were completed for this Scoping Report and their findings are included in this document.

Each of the specialist assessments followed a systematic approach to the identification and assessment of impacts, with the principal steps being:

- Description of existing environment/baseline conditions;
- Prediction of likely potential impacts, including cumulative impacts (both positive and negative);
- Assessment of likely potential impacts (positive and negative);
- Identification of appropriate mitigation measures; and
- Assessment of residual (potential) environmental impacts.

The individual assessment methodologies and baseline descriptions are set out in this report. The approaches are in line with the legal requirements and industry best practice (IBP) guidelines and makes use of the experience and expertise of the EAP and the specialists.

NEED AND DESIRABILITY

Spatial framework and strategic planning / policy documents that are the most relevant on a national, provincial, metropolitan and local level were reviewed as part of this study. Planning policies are discussed in Section 3 of the Draft Scoping Report (DSR) (this report – Volume I) and in detail in the Specialist Scoping Reports (Volume II).

It is established that policy supports the development of renewable energy at all levels of governance. The intent of local, provincial and national policies is to address energy supply issues and aim to promote economic growth in South Africa.

The EIA Regulations, 2014, as amended, state that the objective of the scoping process includes to, through a consultative process, motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.

The Guideline for Need and Desirability released by the DFFE in 2017 was used to assess the need and desirability of the proposed Khoe WEF. According to the DFFE guideline⁴: *“Need and desirability is based on the principle of sustainability, set out in the Constitution and in NEMA, and provided for in various policies and plans, including the National Development Plan 2030 (NDP). Addressing the need and desirability of a development is a way of ensuring sustainable development – in other words, that a development is ecologically sustainable and socially and economically justifiable – and ensuring the simultaneous achievement of the triple bottom-line.”*

Section 8 of this report describes need and desirability for this development in detail and provides an explanation as to why wind energy can be considered as an alternative to meeting the need for increased electricity demand over other sources of generation such as fossil fuels. Summarily, these reasons include:

- Positive impact on climate change;
- Overcoming the country’s energy constraints;
- Diversification and decentralisation of supply;
- Reduced costs of energy; and
- Positive economic development including job creation.

It is the intention of the Project Developer to bid the Khoe WEF in the seventh bidding window of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) with the aim of evacuating the generated power from the WEF into the National Eskom Grid. This will aid in the diversification and stabilisation of the country’s electricity supply in line with the objectives of the Integrated Resource Plan (IRP).

ALTERNATIVES

The Applicant identified the Khoe Wind Energy Facilities after conducting a series of pre-feasibility assessments by considering aspects such as potential wind speed, proximity to the grid connection point, desktop environmental constraints, available land, site access and very suitable topography. The proposed developable area (the proposed development site) was refined based on these initial feasibility assessments and taking into consideration preconstruction avifaunal and bat monitoring results.

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The EIA process is a decision-making tool with the specific aim of selecting an option that will provide an appropriate balance between the benefits of a proposed development and the potential adverse environmental impacts. The EIA process is designed to identify activities, which may have a detrimental effect on the environment, and proposed mitigation measures to minimise or eliminate these potential impacts. Should this balance be achieved, the competent authority (CA) will issue an environmental authorisation, with conditions, for the development to proceed.

⁴https://www.dffe.gov.za/sites/default/files/legislations/needanddesirabilityguideline2017_0.pdf

SCOPING PHASE

The first phase of the EIA process is Scoping. The purpose of the scoping phase is to, through consultation with Interested and Affected Parties (I&APs), determine the extent of the impact assessment, including the potential impacts and issues that must be assessed during the EIA phase. The scoping phase also assesses each alternative (design, technology, location, etc.) of the development, against these potential impacts, to determine the best environmental option for the site to be further assessed during the EIA phase. The scoping phase also determines the methodology and terms of reference for specialist's studies to be undertaken for the proposed development.

This FSR describes the proposed development and includes an assessment of its alternatives. The report documents legal, planning and policy context for the proposed development as a renewable energy development. The baseline environment is described, potential impacts are predicted. It documents the Scoping Phase public participation process (PPP), noting key stakeholders and it describes the EIA Phase assessment methodologies in the Plan of Study for EIA (PSEIA).

Environmental surveys, on site and desktop-based assessments were initiated and where possible, this survey information is included in the DSR. A DSR was compiled and was made available for public and stakeholder review and comment for a legislated period of 30 days during the period 8 January 2023 to 8 February 2024. This application has since lapsed terms of Regulation 21(1) of the NEMA EIA Regulations, as amended. As such, a new application process has been lodged which requires the DSR to be available to the public for an additional 30-day comment period from 29 February 2024 to 02 April 2024. All comments received in response to the DSR will be tabled and responded to in a Comments and Responses Report, which will be attached to the Final Scoping Report (FSR). The Comments and Responses Report will be submitted with the FSR and PSEIA to the DFFE, as the CA for approval to mark the end of the Scoping phase.

EIA PHASE

Once the FSR is accepted by the DFFE, the EAP will compile the Draft EIA Report (DEIAR) and Environmental Management Programme (EMPr) which will be made available for public comment for a further period of 30 days. All comments will be considered and incorporated into the Final EIA Report (FEIAR).

The reports will document the assessment of all potential impacts of the proposed development on the existing baseline environment. This will include an assessment of cumulative impacts between the proposed development, and other developments in the area.

Once the FEIAR has been submitted to the DFFE, the DFFE will then issue a decision on whether to grant or refuse Environmental Authorisation.

DFFE: INFORMATION REQUIREMENTS FOR WEF APPLICATION

The DFFE's requirements for information for all applications for WEFs are included in this section of the report. Where this information is not provided in the tables below, the location of where it can be found in the report is indicated. Should the information not be available at this stage

of the environmental authorisation process (Scoping phase), it is specified that it shall be documented during the EIA phase.

TABLE 0-1 DETAILS OF THE AFFECTED FARM PROPERTIES AND SG 21 CODES

Farm Name	Portion Number	Farm Number	SG 21 Codes
Farm Eendragt	1 (RE)	38	C05000000000003800001
Farm Eendragt	2	38	C05000000000003800002
Farm Eendragt	11	38	C05000000000003800011
Farm Plaas 193	0	193	C050000000000019300000
Farm Eendragt	RE	37	C05000000000003700000

TABLE 0-2 GENERAL SITE INFORMATION

Component	Description/Dimensions
Copies of deeds of all affected farm portions	Submitted with the Application Form to the DFFE.
Location of the site	Approximately 20 km northwest of De Doorns within the Langeberg Local Municipality and the Cape Winelands District Municipality.
Facility Area	Approximately 85 hectares. This is the permanent development footprint
Photos of areas that give a visual perspective of all parts of the site	See Section 5.6
Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)	See Section 5.6

TABLE 0-3 WEF TECHNICAL DETAILS

WEF Technical Details Components	Description/Dimensions - Khoe
Maximum Generation Capacity	Up to 290MW
Turbine Capacity (MW)	Up to 7.5MW
Type of technology	Onshore Wind
Number of Turbines	Up to 38
WTG Hub Height from ground level	Up to 150m
Blade Length	Up to 100m

WEF Technical Details Components	Description/Dimensions - Khoe
Rotor Diameter	Up to 200m
Structure height (Tip Height)	Up to 250m
Structure orientation	Wind Regime dependent
Area occupied by both permanent and construction laydown areas	<ul style="list-style-type: none"> • Concrete turbine foundations - approximately up to 1000m² per turbine • Each turbine will have a hardstand area of approximately up to 7500m² per turbine • Temporary laydown areas (with a combined footprint of up to 9 ha) which will accommodate the boom erection, storage and assembly area; A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha)
Operations and maintenance buildings (O&M building) with parking area	Up to 1 ha
Site Access	Via the R318
Area occupied by inverter transformer stations/substations	Up to 2.5 ha
Capacity of on-site substation	132/33kv
Battery Energy Storage System footprint	Up to 5 ha
BESS type	Solid-State Battery (Lithium-ion) technology
BESS Alternatives (site, technology, design and layout)	Same as above. See layout map (Figure 1-2) for position
Width of internal roads	Access roads to the site and between project components with a width of approximately 4.5 m and a servitude of 13.5 m.
Proximity to grid connection	Not yet confirmed. Grid connection to be assessed in a separate application process.
Internal Cabling	Cabling between the turbines, to be laid underground where practical.
Height of fencing	Up to 3 meters
Water supply, volumes required	±24500m ³ for the construction, commissioning and test phase (±26 months), the majority being consumed during year-one of the construction. ±90m ³ /annum for the life-of-WEF (20-25 years)

TABLE 0-4 SITE MAPS AND GIS INFORMATION

Site Maps and GIS Information	Report Reference
All maps/information layers are provided in ESRI Shapefile format.	
All affected farm portions must be indicated.	See FIGURE 1-2
The exact site of the application must be indicated (the areas that will be occupied by the application).	FIGURE 1-1
A <i>status quo</i> map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	To be produced during EIA phase
Agricultural fields	To be produced during EIA phase
Grazing areas	To be produced during EIA phase
Natural vegetation areas (natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of Critical Biodiversity Areas and Ecological Support Areas	Section 5.1.5.1
Critically endangered and endangered vegetation areas that occur on the site	Section 5.1.5.1
Bare areas which may be susceptible to soil erosion	To be produced during EIA phase
Cultural historical sites and elements	To be produced during EIA phase
Rivers, streams and water courses	See Figure 5-6
Ridgelines and 20 m continuous contours with height references in the GIS database	To be produced during EIA phase
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	To be produced during EIA phase
High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	No high potential agricultural areas have been identified by the specialist.
Buffer zones (also where it is dictated by elements outside the site): 500 m from any irrigated agricultural land 1 km from residential areas	To be produced during EIA phase
Indicate isolated residential, tourism facilities on or within 1 km of the site	To be produced during EIA phase
A slope analysis map/layer that include the following slope ranges: <ul style="list-style-type: none"> Less than 8% slope (preferred areas for turbines and infrastructure) 	To be produced during EIA phase

Site Maps and GIS Information	Report Reference
<ul style="list-style-type: none"> Between 8% and 12% slope (potentially sensitive to turbines and infrastructure) Between 12% and 14% slope (highly sensitive to turbines and infrastructure) Steeper than 18% slope (unsuitable for turbines and infrastructure) 	
A map/layer that indicate locations of birds and bats including roosting and foraging areas	See Section 5.1.5.3, 5.3 and Figure 5-17
<p>A site development proposal map(s)/layer(s) that indicate:</p> <ul style="list-style-type: none"> Turbine positions Foundation footprint Permanent laydown area footprint Construction period laydown footprint Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible). 	See Figure 1-2
River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.	To be produced during EIA phase
Substation(s) and/or transformer(s) sites including their entire footprint.	See Figure 1-2
Cable routes and trench dimensions (where they are not along internal roads) Connection routes to the distribution/transmission network (the connection must form part of the EIA even if the construction and maintenance thereof will be done by another entity such as ESKOM).	To be produced during EIA phase
Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill	To be produced during EIA phase
Borrow pits	To be produced during EIA phase
Spoil heaps (temporary for topsoil and subsoil and permanently for excess material) Buildings including accommodation	To be produced during EIA phase

TABLE 0-5 DEVELOPMENT AREA GEOGRAPHIC COORDINATES- KHOE WEF

Proposed Khoe WEF Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
North West Corner	33° 36' 19.66" S	19° 49' 22.29" E
South West Corner	33° 37' 25.48" S	19° 50' 45.01" E
South East Corner	33° 37' 30.03" S	19° 54' 26.22" E
North East Corner	33° 35' 18.16" S	19° 55' 42.16" E
Substation (Alternative 1 - Preferred)		
North West Corner	33°35'21.68"S	19°52'15.97"E
South West Corner	33°35'24.74"S	19°52'08.65"E
South East Corner	33°35'14.49"S	19°52'22.09"E
North East Corner	33°35'09.96"S	19°52'15.22"E
Substation (Alternative 2)		
Centre Point	33°35'49.88" S	19°53'21.12" E
BESS (Preferred - Alternative 1)		
North West Corner	33°35'25.99"S	19°52'09.19"E
South West Corner	33°35'31.16"S	19°52'19.67"E
South East Corner	33°35'19.52"S	19°52'23.23"E
North East Corner	33°35'17.13"S	19°52'19.52"E
BESS (Alternative 2)		
Centre Point	33°35'52.49"S	19°53'28.75"E
Laydown Area (Alternative 1 - Preferred)		
North West Corner	33°35'22.94"S	19°52'05.27"E
South West Corner	33°35'25.74"S	19°52'08.65"E
South East Corner	33°35'14.49"S	19°52'22.09"E

North East Corner	33°35'09.96"S	19°52'15.22"E
Laydown Area (Alternative 2)		
Centre Point	33° 35' 17.49" S	19° 52' 13.49" E

SPECIALIST INVESTIGATION

Studies including soil, land and agricultural potential, freshwater and wetlands (aquatics), terrestrial biodiversity (flora and fauna), avifauna, bats, visual / landscape, heritage and archaeology, palaeontology, noise, socio-economic and traffic and transportation have been completed and / or is underway to quantify possible impacts and magnitude of impacts.

SUMMARY OF FINDINGS

The FSR has captured the key and/or scoped issues and impacts for this proposed development by taking into account the findings of the specialists' scoping reports. The specialist reports document anticipated environmental impacts that may be experienced within both the biophysical and social environments.

It is the opinion of the EAP based on the assessments undertaken thus far that the application can proceed to the EIA phase and the scoping report can be accepted by the DFFE.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

FE Hugo and Khoe (Pty) Ltd is applying for an Environmental Authorisation to construct and operate the Khoe Wind Energy Facility (WEF) with a capacity of up to 290 MW. Additional ancillary infrastructure to the WEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), foundations to support turbine towers, internal/ access roads linking the wind turbines and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed). The proposed development is located near the De Doorns town in the Western Cape Province. Hereafter, the proposed Khoe WEF as well as its associate infrastructure will be referred to as the “proposed development”.

The proposed development is located approximately 20 km southeast of the De Doorns town within the Langeberg Local Municipality and the Cape Winelands District Municipality of the Western Cape Province (see Fugre 1-1). FE Hugo and Khoe also proposed to develop and operate the Hugo WEF, which is situated approximately 13 km north of the Khoe WEF. The Hugo WEF will form part of a separate application process. However, it will run parallel to the Khoe WEF application process. As such, this report is strictly pertaining to the development and operation of the proposed Khoe WEF.

As per the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), the Project Applicant appointed Environmental Resources Management Southern Africa (Pty) Ltd. (ERM) as the independent Environmental assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for Environmental Authorisation.

1.2 PROJECT LOCATION

The WEF will be located on the land parcels detailed in the Table 1-1 below. The final design, which will be requested for approval in the EA, will be determined based on the outcome of the specialist studies undertaken for the EIA phase of the development.

TABLE 1-1: AFFECTED FARM PORTIONS

Farm Name	Farm Number	Portion Number	SG Digits
Eendragt	1 (RE)	38	C05000000000003800001
Eendragt	2	38	C05000000000003800002
Eendragt	11	38	C05000000000003800011
Plaas 193	0	193	C050000000000019300000
Eendragt	RE	37	C05000000000003700000

FIGURE 1-1 HUGO AND KHOE WIND ENERGY FACILITY LOCALITY MAP

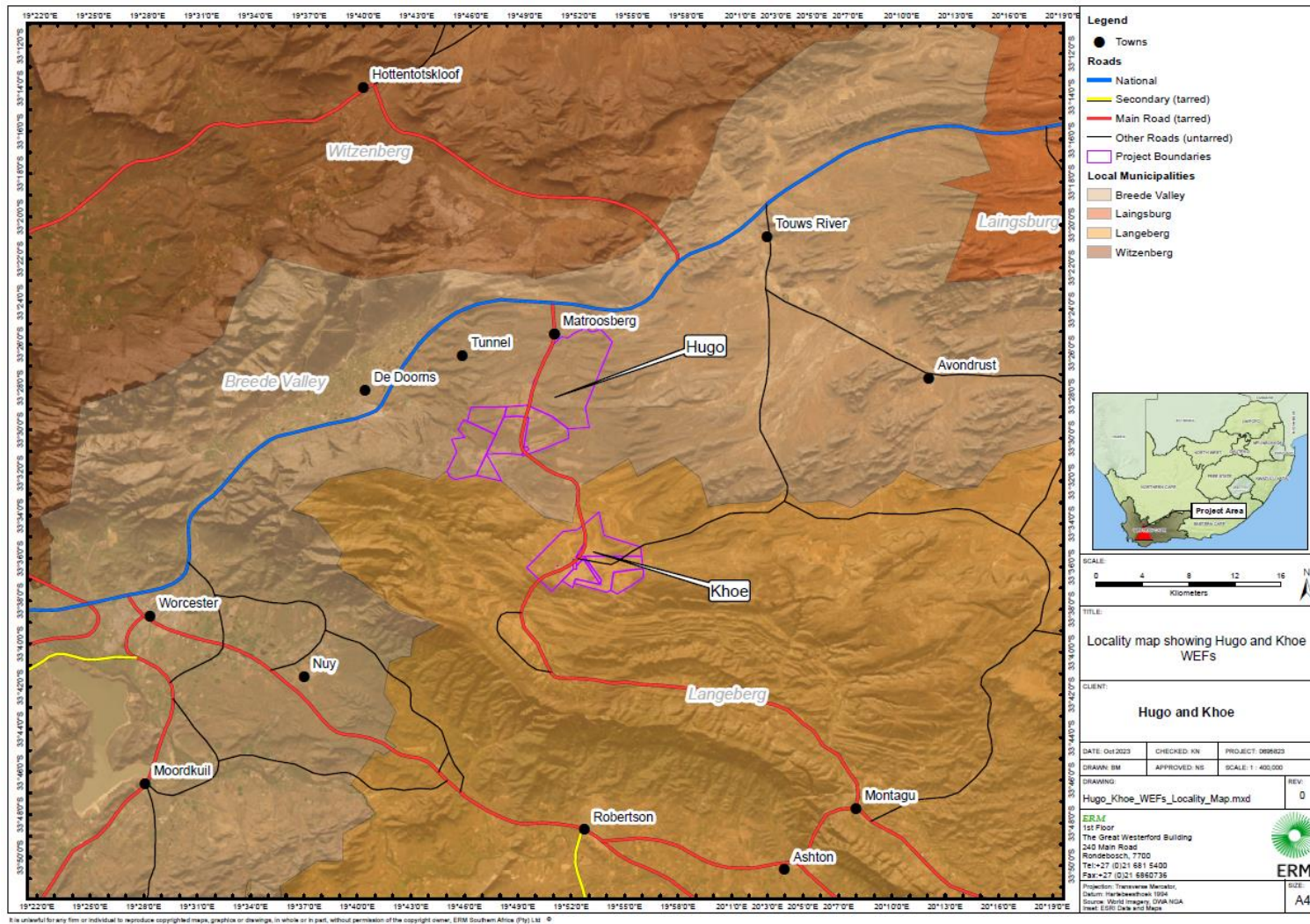
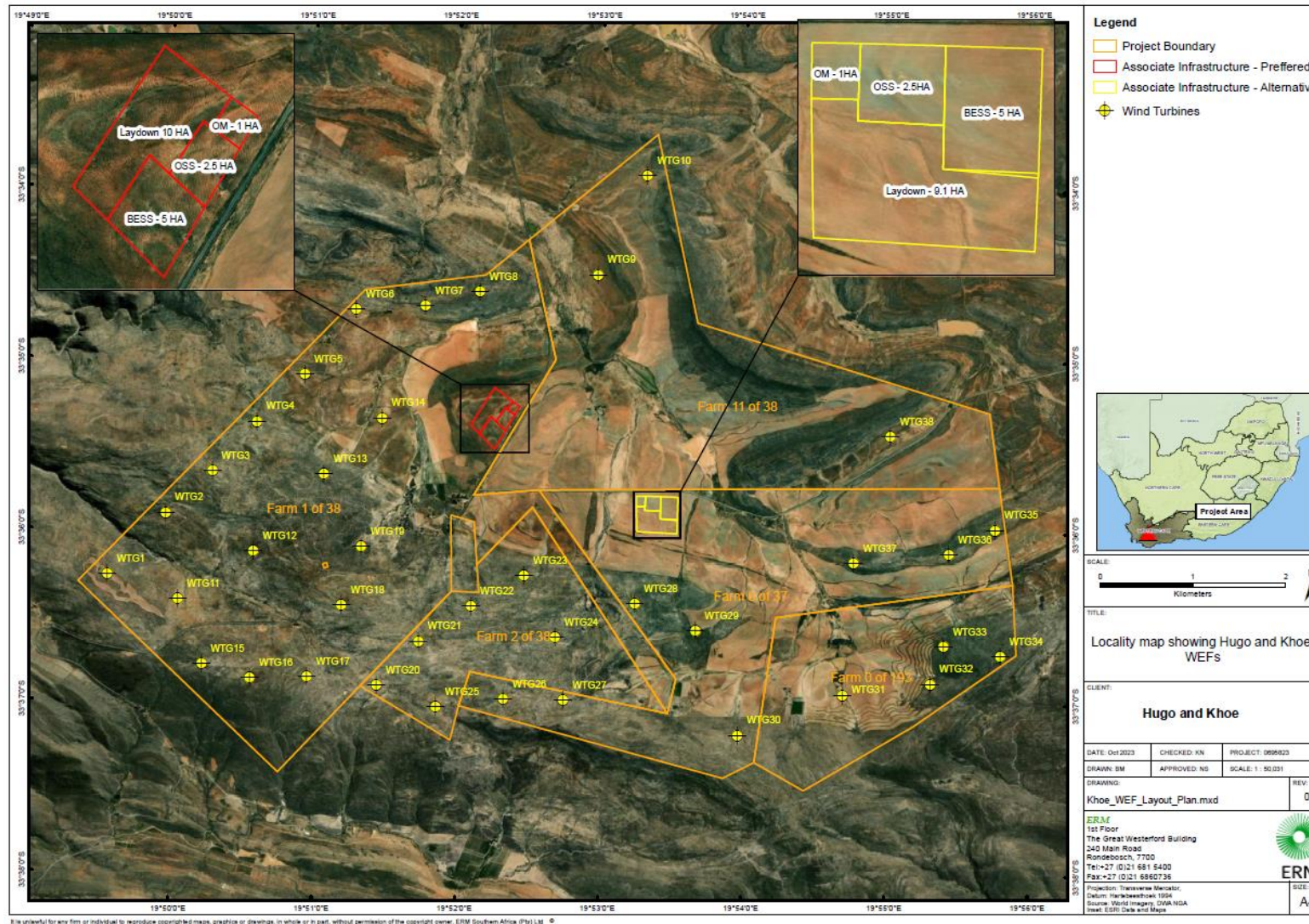


FIGURE 1-2 KHOE WIND ENERGY FACILITY LAYOUT PLAN



1.3 PURPOSE AND AIM OF THE SCOPING REPORT

This Draft Scoping Report (DSR) aims to present and assess the baseline environment, as well as the initial proposed site development plan. While a preliminary turbine layout has been provided, the precise location of each wind turbine, and associated infrastructure has not been finalised and will be determined by the findings of the various specialist assessments, as well as other technical and financial constraints for this proposed development site. The site development plan will continue to be refined through an iterative process taking into consideration the specialists' findings.

2. TERMS OF REFERENCE

The primary objective of the S&EIA process is to present sufficient information to the competent authority (CA) and interested and affected parties (I&APs) on predicted potential impacts and develop the plan of study for the EIA.

The existing environment within which a proposed development is proposed to be located is investigated, through a review of relevant background literature and ground-truthing and any required long-term on-site monitoring.

In terms of legal requirements, the NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the Scoping Report (SR) and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 2.1 shows how and where the legal requirements are addressed in this Scoping Report. Section 7 of this SR provides a summary of the Public Participation Process (PPP). The final SR will include all Public Participation undertaken, where comments received on the DSR will be collated and included in the FSR.

As per the EIA Regulations 2014, as amended, "the objective of the scoping process is to, through a consultative process-

- a. Identify the relevant policies and legislation relevant to the activity;
- b. Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- c. Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- d. Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of identification of cumulative impacts and a ranking process of all the identified alternatives on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- e. Identify the key issues to be addressed in the assessment phase;
- f. 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 preferred site through the life of the activity, including the nature, significance, consequence, extent, duration, and probability of the impacts to inform the location of the development footprint within the preferred site; and

- g. Identify suitable measures to avoid, manage or mitigate identified impacts to determine the extent of the residual risks that need to be managed or monitored.”

The above activities are completed through consultation with:

- The lead authorities involved in the decision-making for the application (in this case, the DFFE);
- I&APs, provincial and local governments, and other relevant organisations to ensure that local issues are well understood; and
- The specialist team to ensure that technical issues are identified.

The existing environment within which a proposed development is to be located is investigated, through a review of relevant background literature and ground-truthing and any required long-term on-site monitoring.

A primary objective is to present key stakeholders with the findings of the assessments, obtain and document feedback and address all issues raised.

TABLE 2-1 LEGISLATIVE REQUIREMENTS FOR SCOPE OF ASSESSMENT AND CONTENT OF THE SCOPING REPORT

	<i>Appendix 2 Requirements NEMA, 1998 (Act No. 107 of 1998)</i>	<i>Report Reference</i>
2 (1)	<i>A scoping report must information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include-</i>	
(a)	<i>details of-</i> <i>i.the EAP who prepared the report; and</i> <i>ii.the expertise of the EAP, including a curriculum vitae;</i>	Section 2.2 and Appendix A
(b)	<i>the location of the activity, including-</i> <i>i.the 21 digit Surveyor General code of each cadastral land parcel;</i> <i>ii.where available, the physical address and farm name;</i> <i>iii.where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;</i>	Executive Summary
(c)	<i>a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-</i> <i>i.a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</i> <i>ii.on land where the property has not been defined, the coordinates within which the activity is to be undertaken;</i>	Figure 2 – Site Locality Map
(d)	<i>a description of the scope of the proposed activity, including-</i> <i>i.all listed and specified activities triggered;</i>	Table 3.1 Section 7

<i>Appendix 2 Requirements NEMA, 1998 (Act No. 107 of 1998)</i>		<i>Report Reference</i>
	<i>ii.a description of the activities to be undertaken, including associated structures and infrastructure;</i>	
<i>(e)</i>	<i>a description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;</i>	Section 3
<i>(f)</i>	<i>a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;</i>	Section 8
<i>(g)</i>	<i>a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including-</i>	Section 6 - 8
	<i>i.details of the alternatives considered;</i>	
	<i>ii.details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</i>	Section 9
	<i>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;</i>	Section 9
	<i>iv.the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>	Section 5
	<i>v.the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts-</i> <i>(aa) can be reversed;</i> <i>(bb) may cause irreplaceable loss of resources; and</i> <i>(cc) can be avoided, managed or mitigated;</i>	Section 10 - 11
	<i>vi.the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</i>	Section 4
	<i>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;</i>	Section 10 - 11

<i>Appendix 2 Requirements NEMA, 1998 (Act No. 107 of 1998)</i>		<i>Report Reference</i>
	<i>viii.the possible mitigation measures that could be applied and level of residual risk;</i>	Section 10 - 11
	<i>ix.the outcome of the site selection matrix;</i>	Section 6 – 11
	<i>x.if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</i>	Section 6
	<i>xi.a concluding statement indicating the preferred alternatives, including preferred location of the activity;</i>	Section 7
<i>(h)</i>	<p><i>a plan of study for undertaking the environmental impact assessment process to be undertaken, including -</i></p> <ul style="list-style-type: none"> <i>i.a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;</i> <i>ii.aspects to be assessed by specialists;</i> <i>iii.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;</i> <i>iv.a description of the proposed method of assessing duration and significance;</i> <i>v.an indication of the stages at which the competent authority will be consulted;</i> <i>vi.particulars of the public participation process that will be conducted during the environmental impact assessment process; and</i> <i>vii.a description of the tasks that will be undertaken as part of the environmental impact assessment process;</i> <i>viii.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.</i> 	Section 12
<i>(i)</i>	<p><i>an undertaking under oath or affirmation by the EAP in relation to-</i></p> <ul style="list-style-type: none"> <i>i.the correctness of the information provided in the report;</i> <i>ii.the inclusion of comments and inputs from stakeholders and interested and affected parties; and</i> <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;</i> 	Appendix A
<i>(j)</i>	<i>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;</i>	Appendix A

<i>Appendix 2 Requirements NEMA, 1998 (Act No. 107 of 1998)</i>		<i>Report Reference</i>
(k)	<i>where applicable, any specific information required by the competent authority; and</i>	n/a
(l)	<i>any other matters required in terms of section 24(4)(a) and (b) of the Act.</i>	n/a
2 (2)	<i>Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.</i>	Section 3

2.2 REPORT STRUCTURE

The application for environmental authorisation and assessment of impacts is ultimately a decision-making process with the specific aim of selecting an option that is technically feasible, practical, and will cause the least impact to the environment. The SR contains the following information:

- Nature of the activity;
- Need and desirability of the proposed development;
- Description of the receiving environment;
- Identification of potential feasible alternatives;
- Identification of potential positive and negative impacts;
- Identification of knowledge gaps; and
- A Plan of Study for the EIA Phase.

The SR also contains the PSEIA. This plan sets out the proposed approach to the EIA Phase study including the:

- Tasks that will be undertaken, including specialist reports and the manner in which such tasks will be completed;
- Stages at which the CA will be consulted; and
- Description of the methods of assessment and the details of the PPP.

The SR is set out in two volumes:

- Volume I: Scoping Report
- Volume II: Specialist Scoping Reports

The independent environmental assessment practitioner (EAP) and specific specialists identified potential negative and positive impacts that could arise as a result of the proposed development and the plan of study for the EIA phase has been developed. The appointment of specialists was made based on the list of specialists identified by the Screening Report (see Volume II) generated for the proposed development on the DFFE Screening Tool Portal. The structure of the report is provided in Table 2-2 below.

TABLE 2-2 STRUCTURE OF THIS SCOPING REPORT

Section	Title	Containing
Volume I: Scoping Report		Assessment of the Proposed Development
-	Executive Summary	Summary of the Project Specifications, Listed Activities, Specialist Investigations and Findings.
1	Introduction	Project Introduction, and Purpose and Aim of the Report.
2	Terms of Reference	Structure of the SR, Project Team Details, Responses to DFFE Comments and Assumptions and Limitations of the Study.
3	Environmental Legal Framework	National Environmental Legislation, Applicable Acts, International Conventions and Treaties, Policies and Guidelines.
4	Scope of Work and Scoping Phase Methodology	Environmental Screening Tool Results, Specialists Studies Methodology, Assessment Techniques for the S&EIA.
5	Description of the Baseline Environment	A Description of the Receiving Environment.
6	Assessment of Alternatives	No-Go, Site Selection, Design Evolution and Technology Alternatives.
7	The Preferred Alternative	Description of the Preferred Proposed Development, including a description of the location, technical specifications, and components.
8	Need and Desirability	Brief description of the Need and Desirability of the Proposed Development.
9	Public Participation Process	Initial and Scoping Phase - Public Participation Process, Summary of Issues.
10	Assessment of Potential Impacts	An Assessment of the Potential Impacts during the Construction, Operational and Decommissioning Phases.
11	Assessment of Cumulative Impacts	An Assessment of the Potential Cumulative Impacts.
12	Summary of Findings	A Summary of the Findings.
13	Plan of Study for EIA	Documents aspects requiring further assessment and the assessment methods proposed for the EIA Phase.
Appendix A	EAP Declaration of Independence and CV	EAP Commissioner of Oaths Declaration of Independence and CV.
Appendix B	Maps / Plans	Project Location Map
		Preliminary Site Layout Map
		Sensitivity Map
Volume II: Specialist Scoping Reports		Respective Specialist Scoping Reports.
		DFFE Screening Tool Report
		Soil, Land Use and Agricultural Potential
		Heritage and Palaeontology
		Noise

Section	Title	Containing
		Visual/ Landscape
		Traffic
		Biodiversity
		Socio-Economic
		Avifauna
		Bats
		Freshwater and Wetlands (Aquatics)

2.3 PROJECT TEAM DETAILS

The Applicant, FE Hugo & Khoe (Pty) Ltd, appointed ERM, with the lead EAP being Khosi Ngema to co-ordinate and manage the S&EIA application process. The appointed specialist team was based on the results of the DFFE Screening Tool Report generated.

TABLE 2-3 DETAILS OF THE APPLICANT

Name of the Applicant	FE Hugo & Khoe (Pty) Ltd		
Name of contact person for applicant (if other)	Mr Thomas Condesse		
Company Registration Number	K2022778660		
BBBEE status	n/a		
Physical address	15 Bridgeway Road, Bridgeways Precinct, Century City, Cape Town		
Postal address	15 Bridgeway Road, Bridgeways Precinct, Century City, Cape Town		
Postal code	7441	Cell:	+33 6 22 66 59 32
Telephone	-	Fax:	-
E-mail	Thomas.Condesse@energyteam.co.za/Deon.lottering@energyteam.co.za		

TABLE 2-4 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of the EAP organisation	Environmental Resource Management (Pty) Ltd		
Details of the organisation	Environmental Resources Management Southern Africa		
Environmental Assessment Practitioner	Khosi Ngema		
Consultant	Khosi Ngema		
Postal address	Postnet Suit 642, Private Bag X29, Gallo Manor		
Telephone	+27 11 798 4300	Postal Code:	2052
Cellular	+27 82 625 9779	Fax:	NA

Name of the EAP organisation	Environmental Resource Management (Pty) Ltd
E-mail	Khosi.ngema@erm.com
EAP Qualifications	BSc Honours in Environmental Science, University of KwaZulu-Natal
Details of EAP Expertise	8 years in Environmental Consulting

Refer to Appendix A for the EAP's Declaration of Interest and Curriculum Vitae

TABLE 2-5 S&EIA PROJECT TEAM

Discipline	Specialist	Specialist Organisation
EAP	Khosi Ngema	ERM (Pty) Ltd
Soil and Agricultural Potential	Johann Lanz	Independent Consultant
Avifauna	Dr Rob Simmons	Birds and Bats Unlimited
Bats	Stephanie C Dippenaar	EkoVler
Visual / Landscape	Lourens du Plessis	LOGIS
Heritage and Palaeontology	John Gribble	TerraMare Archaeology
Noise	Mornè De Jager	Enviro Acoustic Research
Socio-Economic	Tony Barbour	Independent Consultant
Traffic and Transportation	Victor de Abreu and Reabetswe Mokomele	SMEC
Terrestrial Biodiversity (Fauna and Flora)	Owen Davies and Juan Swanepoel	ERM
Freshwater and Wetlands (Aquatics)	Brian Colloty	EnviroSci

2.4 DFFE COMMENTS ON DRAFT SCOPING REPORT

DFFE comments will be included and responded to in the Comments and Responses Report, which will be submitted with the FSR. These comments will also be addressed in the FSR and appendices where applicable.

2.5 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are applicable:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- It is assumed that the information contained in the Screening Tool Reports generated are accurate and correct and valid at the time of preparing this report.
- The project description information provided is preliminary and will require further detailed investigation, which will form part of the subsequent stages of this EIA process. Statements

or indicators of significance in this report must be considered considering the uncertainty regarding the exact extent and significance of resources on the site at this stage of the process.

- The general location of the proposed wind turbines, have been indicated. The actual position of each wind turbine will be determined by the outcome of the EIA process, as will the exact location of the proposed O&M buildings.
- With respect to specialist assessments, most have assumed that the issues identified are likely to be similar to other proposed WEF projects in the area, and desktop surveys and site visits have been carried out for the Scoping Phase of this EIA. Specialist site visits, and modelling has been undertaken and should further visits be required these will inform the EIA phase of the application process.
- The assumptions and limitations, presented in each specialist report, Volume II of this report, are noted.
- The developments to be included in the cumulative assessment is based on available public information, the most current DFFE database of renewable applications (at the time of writing the report, REEA_OR_2023_Q1.shp⁵), and if the applicant has submitted an application for EA.
- It is assumed that the PSEIA phase will be accepted and approved.

⁵ South African Renewable Energy EIA Application Database (<http://egis.environment.gov.za/frontpage.aspx?m=27>).

3. ENVIRONMENTAL LEGAL FRAMEWORK

The proposed development requires environmental authorisation prior to being constructed and operated. This section of the report highlights the important environmental legal considerations taken while undertaking this S&EIA process.

3.1 THE NATIONAL ENVIRONMENT MANAGEMENT ACT, 1998 (ACT NO 107 OF 1998)

Section 2 of the National Environment Management Act, 1998 (NEMA) as amended, lists environmental principles that are to be applied by all organs of state regarding developments that may significantly affect the environment. Included amongst the key principles is the principle that all developments must be socially, economically, and environmentally sustainable, and environmental management must place people and their needs at the forefront of its concern, to serve their physical, psychological, developmental, cultural and social interests equitably.

NEMA, as amended, also provides for the participation of potential and registered I&APs and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA, as amended, outlines the general objectives and implementation of Integrated Environmental Management (IEM), the latter providing a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for the granting of environmental authorisations.

To give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed, and reported to the competent authority. Section 24(4) outlines the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

3.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 AS AMENDED

The EIA Regulations 2014 as amended by GNR 326 of 2017 provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the Department of Forestry and Fisheries (DFFE).

The DFFE is the competent authority for all renewable energy proposals which will be bid into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), as NEMA, as amended, states that:

"24C. (2) The Minister must be identified as the competent authority in terms of subsection (1) if the activity- (a) has implications for international environmental commitments or Relations"

It is the intention of the Project Applicant to bid on the Khoe WEF in the next bidding window of the REIPPPP with the aim of evacuating the generated power from the WEF into the National Eskom Grid.

Environmental authorisation, which may be granted subject to conditions, will only be considered upon compliance with GNR982, as amended by GNR326 of 7 April 2017.

Any Environmental Authorisation obtained from the DFFE applies only to those specific listed activities for which the application was made. To ensure that all Listed Activities that could potentially be applicable to this proposal are covered by the Environmental Authorisation, a precautionary approach is followed when identifying listed activities, that is, if an activity could potentially be part of the proposed development, it is listed.

The Listed Activities applicable to this proposed project are presented in Table 3.1 below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this authorisation process.

TABLE 3-1 NEMA LISTED ACTIVITIES IN RELATION TO THE PROPOSED DEVELOPMENT

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 – GNR 327		
Listing Notice 1 GN R 327 Activity 11(i)	<i>The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;</i>	FE Hugo and Khoe propose to develop an on-site substation at the Khoe WEF location with a capacity of 132 kV to facilitate the connection to the national grid. The turbines will be connected to the on-site substation via cabling with a capacity of 33kv or more, the development footprint for the facility substation is located outside of an urban area.
Listing Notice 1 GN R 327 Activity 12(ii)(a)(c)	<i>The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs— (a) within a watercourse; or (c) within 32 metres of a watercourse</i>	The WEF will require the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 100m ² within or within 32m of drainage features, ephemeral washes or streams present within the project site.
Listing Notice 1 GN R 327 Activity 14	<i>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 cubic meters or more but not exceeding 500 cubic meters.</i>	The development of the WEF will include the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents associated with the facility, and facility substation) where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters. The volumes are not known at the time but will have a maximum combined capacity of 400 m ³ .
Listing Notice 1 GN R 327 Activity 19(i)	<i>The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.</i>	Drainage features, ephemeral washes or streams are present within the project site. During the construction phase, more than 10 m ³ of rock will be removed from drainage features for the construction of the wind energy facility and associated infrastructure.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 24(ii)	<i>The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8metres;</i>	The width of the internal access roads between the project components will be approximately 8m but may be up to 10m wide where required for the movement of the crane between turbine positions.
Listing Notice 1 GN R 327 Activity 28(ii)	<i>Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.</i>	The total area to be developed for the WEF (including the facilities substations) are greater than 1 ha and occurs outside an urban area and is currently used for agricultural purposes, mainly grazing. The WEF is located outside an urban area. The proposed development is approximately 85HA.
Listing Notice 1 GN R 327 Activity 56(i)(ii)	<i>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres.</i>	Existing farm roads within the project site will be widened to up to 8 m and/or lengthened by more than 1 km to accommodate the movement of heavy vehicles and cable trenching activities.
Listing Notice 2 – GNR 325		
Listing Notice 2 GN R 325 Activity 1	<i>The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.</i>	The Khoe WEF is anticipated to have an electricity capacity of up to 290 MW.
Listing Notice 2 GN R 325 Activity 15	<i>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity</i>	The total for the Khoe WEF is ~4,113 ha, with a development footprint of ~ 85 ha. The project is proposed on a property where the predominant land use is grazing and comprises of indigenous vegetation. It is therefore anticipated that over 20 ha of indigenous vegetation will be cleared as a result of the development.
Listing Notice 3 – GNR 324		
Listing Notice 3 GN R 324 Activity 4(i)(ii)(aa)	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres (i) in the Western Cape, (ii) outside urban areas (aa) within areas containing indigenous vegetation</i>	Existing roads on the affected properties will be used where feasible and practical. The width of the main access roads at the access points will be up to 8 m. The WEF will have internal access roads of up to 4.5 m wide, with a servitude of up to 13.5 m, which will include additional space required for cut and fill, side drains and other stormwater control measures, turning areas and vertical and horizontal turning radii to ensure

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
		<p>safe delivery of the WTG components. Internal roads will provide access to each turbine, the on-site substation hub (which includes substation infrastructure, BESS and Balance of Plant area).</p> <p>The project site is located within the Western Cape Province, outside of an urban area and on land containing indigenous vegetation.</p>
<p>Listing Notice 3 GN R 324 Activity 18(i)(ii)(aa)</p>	<p><i>The widening of a road by more than four (4) meters, or the lengthening of a road by more than one (1) kilometre within</i> <i>(i) the Western Cape, and</i> <i>in</i> <i>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined;</i> <i>(aa) Areas containing indigenous vegetation.</i></p>	<p>Existing farm roads within the project site will be widened to up to 10 m. The project site is located in the Western Cape, outside of an urban area, on land containing indigenous vegetation and within 100 m of the edge of a watercourse.</p>

3.3 THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO 25 OF 1999 - NHRA)

Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

- “(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (c) any development or other activity which will change the character of a site; and (i) exceeding 5,000 m² in extent.”

The NHRA, 1999, requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development. The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, 1999, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA, Act 107 of 1998) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA, 1999, and take into account any comments and recommendations made by the relevant heritage resources authority.

The Notice of Intent to Develop (NID), was submitted to Heritage Western Cape (HWC) on 24 November 2023.

In South Africa, the law is directed towards the protection of human-made heritage, although places and objects of scientific importance are covered. The NHRA, 1999, also protects intangible

heritage such as traditional activities, oral histories, and places where significant events happened. While not specifically mentioned in the NHRA, scenic routes are recognised as a category of heritage resources which requires grading as the Act protects areas of aesthetic significance.

The heritage impact assessment reports will be submitted to HWC for comment.

3.4 NATIONAL DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT (DALRRD)

A renewable energy facility requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) if the facility is on agriculturally zoned land. A No Objection Letter for the change in land use is required. This letter is one of the requirements for receiving municipal rezoning. This application requires motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the development site. This process is separate from the S&EIA process and should not affect the EA decision.

3.5 SUBDIVISION OF AGRICULTURAL LAND ACT, 1970 (ACT NO. 70 OF 1970 - SALA)

In terms of the Subdivision of Agricultural Land Act, 1970, any application for change of land use must be approved by the Minister of Agriculture. This is a consent for long-term lease in terms of the SALA. If DALRRD approval for the development has already been obtained in the form of the No Objection letter, then SALA approval should not present any difficulties. Note that SALA approval is not required if the lease is over the entire farm portion. SALA approval (if required) can only be applied for once the Municipal Rezoning Certificate and Environmental Authorisation has been obtained.

3.6 CONSERVATION OF AGRICULTURAL RESOURCES, 1983 (ACT NO. 43 OF 1983)

The Conservation of Agricultural Resources Act (CARA), 1983 states that no degradation of natural land is permitted. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

Rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as "any act by means of which the topsoil is disturbed mechanically". The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA.

3.7 NATIONAL VELD AND FOREST FIRE ACT, 1998 (ACT NO. 101 OF 1998)

The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act (Act 12 of 2001), is to prevent and combat veld, forest, and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of landowners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.

3.8 THE ENVIRONMENT CONSERVATION ACT, 1989 (ACT NO. 73 OF 1989), THE NATIONAL NOISE CONTROL REGULATIONS: GN R154 OF 1992

The Environment Conservation Act, 1989 (ECA) allows the Minister of Environmental Affairs and Tourism (now the "Minister of Forestry, Fisheries and the Environment") to make regulations regarding noise, amongst other concerns. The Minister has made noise control regulations under the ECA.

In terms of section 25 of the ECA, the national noise-control regulations (NCR) were promulgated (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992). The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the NCR was devolved to provincial and local authorities.

These regulations define "**disturbing noise**" as:

"Noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more".

These Regulations prohibit anyone from causing a disturbing noise. The Noise Assessment will take these Regulations into consideration when identifying and assessing the potential noise impacts associated with the proposed development.

3.9 NATIONAL CLIMATE CHANGE RESPONSE WHITE PAPER (2011)

Climate change is already a measurable reality and along with other developing countries, South Africa is especially vulnerable to its impacts. This White Paper presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa's response to climate change has two objectives:

- Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.
- Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

3.10 WESTERN CAPE CLIMATE CHANGE RESPONSE STRATEGY: VISION 2050 (2022)

Globally, climate change is being recognised as an Emergency, with immediate systems change required to achieve significant emissions reductions by 2030 and maintain a habitable planet for all, whilst adjusting to the spreading impacts of climate change. The Western Cape has already started to experience the impacts of climate change and these are undermining our social and economic development gains. An accelerated response is required to address the threats and opportunities posed by climate change across the spectrum of the sectors of the region and the Western Cape Government. This Strategy guides the bold shifts required by 2030 to ensure we both meet our emissions reductions targets and create social, ecological and economic resilience in the face of climate destabilisation through the course of the next three decades up to 2050.

The Western Cape Climate Change Response Strategy: Vision 2050 (WCCCRS) describes a climate future that the Western Cape province will strive towards. It is centered on a Vision and four Guiding Objectives defining the direction of climate change response action for the region, with corresponding targets and actions.

3.11 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT, 2004 (ACT NO. 39 OF 2004)

Section 34 of the Air Quality Act, 2004 (AQA) makes provision for:

- (1) The Minister to prescribe essential national noise standards –
 - a. For the control of noise, either in general or by specified machinery or activities or in specified places or areas; or
 - b. For determining –
 - i. a definition of noise; and
 - ii. the maximum levels of noise.
- (2) When controlling noise, the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act is in force, but no such standards have yet been promulgated.

An atmospheric emission license issued in terms of Section 22 may contain conditions in respect of noise. This, however, will not be relevant to this proposed development.

3.11.1 NATIONAL DUST CONTROL REGULATIONS, 2013

The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control, and reporting.

The acceptable dust fall out rates are:

Restriction Area	Dust Fall (D) (mg/m ² /day, 30 day average)	Permitted Frequency of exceedance
Residential	D < 600	Two within a year, not sequential months
Non-Residential	600 < D < 1200	Two within a year, not sequential months

These rates are to be adhered to by the developer during the life of the project.

3.12 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998 - NWA)

The National Water Act, 1998 (NWA) provides for constitutional requirements including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State.

A water resource includes any watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse is interpreted as a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse.

Relevant water uses for the proposed construction of the WEF which will require access roads over watercourses and drainage channels and boreholes for construction water, in terms of Section 21 of the Act include but are not limited to the following:

- Section 21 (a): Abstraction of water from boreholes and rivers or dams;
- Section 21 (b): Storage of water (dams or reservoirs);
- Section 21 (c): Impeding or diverting the flow of water in a watercourse;
- Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse; and
- Section 21 (g): Storage of domestic waste in conservancy tanks.

GN 1199 of 18 December 2009 grants general authorisation (GA) for the above water uses based on certain conditions. It also stipulates that these water uses must be registered with the responsible authority.

Pollution of river water is a contravention of the NWA. Chapter 3, Part 4 of the NWA deals with pollution prevention and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

Chapter 3, Part 5 of the NWA deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. The responsibility for remedying the situation rests with the person responsible for the incident or the substance involved.

3.12.1 PERMIT REQUIREMENTS

A Water Use License Application (WULA) or a General Application (GA) may be required. This will be determined by the Department of Water and Sanitation (DWS) during the WULA pre-application process.

This process will run separate to this EA application process.

3.13 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004 - NEMBA)

3.13.1 THREATENED OR PROTECTED SPECIES LIST, 2015

Amendments to the Threatened or Protected Species (TOPS) list were published on 31 March 2015 in Government Gazette No. 38600 and Notice 256 of 2015. Certain flora and fauna that occur on the site may be threatened or protected.

3.13.2 ALIEN AND INVASIVE SPECIES REGULATIONS, 2016

The Act and Regulations set out various degrees of Invasive Species (Plants, Insects, Birds, Animals, Fish and Water Plants) and requires that certain of those invasive species are documented and, in some cases, removed from properties in South Africa.

The Regulations list 4 categories of invasive species that must be managed, controlled, or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa. A Terrestrial Ecology Assessment will be conducted as part of this S&EIA process to identify as well as propose ways in which to manage alien invasive species found at the proposed site area.

3.14 WESTERN CAPE BIODIVERSITY ACT (WCBA, ACT 6 OF 2021)

The WCBA and its implementation through regulations will enable a transformed biodiversity economy focusing on enabling access to critical resources in an equitable and sustainable manner.

The WC Biodiversity Act sets out a best practice model for the governance of public entities. This will further enable CapeNature's successes and ability to pursue the multiple objectives of protection and management of the world-renowned biodiversity and ensure that protected areas enable economic opportunities in local rural economies.

3.15 NATIONAL FORESTS ACT, 1998 (ACT NO. 84 OF 1998 - NFA)

This act lists protected tree species and prohibits certain activities. The prohibitions provide that *"no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister"*.

Any protected tree species recorded within the proposed site area shall be managed in accordance with the NFA as relevant.

3.16 ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007 (ACT. 21 OF 2007)

The Act provides for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy. The Square Kilometre Array radio telescope is located in the declared Karoo Central Advantage Array and as such it is protected against harmful interference from wireless communication and electromagnetic emissions from electrical equipment.

According to the DFFE Screening Tool, there were no Weather Radar installations within a 60km radius.

3.17 NATIONAL ROAD TRAFFIC ACT, 1996 (ACT NO. 93 OF 1996) (NRTA)

The technical recommendations for highways (TRH 11): *"Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads"* outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.

Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.

The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.

The South African National Roads Authority (SANRAL) and the Provincial Department of Transport would act as a Competent/Commenting Authority as a result of the proposed road infrastructure associated with the Khoe WEF.

3.18 CIVIL AVIATION ACT, 2009 (ACT NO. 13 OF 2009) (CAA)

The Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA), governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).

The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must be assessed by SACAA in terms of the CARs and the South African Civil Aviation Technical Standards (SA CATs), in order to ensure civil aviation safety.

The SACAA and Air Traffic Navigation Services (ATNS) is included as a stakeholder and will be provided with an opportunity to comment on the application during the public participation process.

3.19 PROMOTION OF ACCESS TO INFORMATION ACT, 2000 (ACT NO. 2 OF 2002) (PAIA)

The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.

The PAIA will be adhered to during all stakeholder engagement activities undertaken as part of this S&EIA process.

3.20 NATIONAL ENVIRONMENTAL MANAGEMENT ACT: NATIONAL APPEALS REGULATIONS, 2014

The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National environmental management act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.

3.21 ADDITIONAL RELEVANT LEGISLATION

The applicant must also comply with the provisions of other relevant national legislation. Additional relevant legislation that has informed the scope and content of this S&EIA Report includes the following:

- Constitution of the Republic of South Africa, 1996 (Act No. 108, 1996);

- Aviation Act, 1962 (Act No. 74, 1962);
- National Environmental Management: Waste Act, 2008 (Act No. 59, 2008);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57, 2003);
- National Roads Act, 1998 (Act No. 7, 1998)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);
- National Veld and Forest Fire Bill of 10 July 1998;
- Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); and
- Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000; as amended); and
- Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended.

3.22 CONVENTIONS AND TREATIES

3.22.1 THE PARIS AGREEMENT (2016)

South Africa is one of 195 countries that are signatory to The Paris Agreement. The Paris Agreement is a legally binding instrument within the United Nations Framework Convention on Climate Change (UNFCCC) that provides guidance for action on climate change, focusing on sustainable development and poverty eradication. It sets the goal of preventing increase in global average temperature to below 2 degrees Celsius and pursuing efforts to limit global temperature increase to 1.5 degrees Celsius. Previous Minister of the DFFE, Ms Edna Molewa, signed the Paris Agreement on Climate Change on behalf of South Africa on 22 April 2016.⁶

The proposed WEF fits the emission reduction targets of the Paris Agreement and its aim of sustainable development.

3.23 THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD) (1993)

This is a multilateral treaty for the international conservation of biodiversity, the sustainable use of its components and fair and equitable sharing of benefits arising from natural resources. Signatories have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. South Africa became a signatory to the CBD in 1993, which was ratified in 1995.

The convention prescribes that signatories identify components of biological diversity important for conservation and monitor these components in light of any activities that have been identified which are likely to have adverse impacts on biodiversity. The CBD is based on the precautionary principle which states that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat and that in the absence of scientific consensus the burden of proof that the action or policy is not harmful falls on those proposing or taking the action.

⁶https://www.environment.gov.za/mediarelease/southafrica_ratifies_parisagreement (accessed on 24 January 2019).

3.23.1 THE RAMSAR CONVENTION (1971)

The Convention on Wetlands, called the Ramsar Convention, as it was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, is an intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. Under the three pillars of the convention the Contracting Parties commit to work towards the wise use of all their wetlands through national plans, policies and legislation, management actions and public education; designate suitable wetlands for their list of Wetlands of International Importance (the "Ramsar List") and ensure their effective management; and Cooperate internationally on transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

3.23.2 THE CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS (CMS OR BONN CONVENTION) (1983)

An intergovernmental treaty, concluded under the sponsorship of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The fundamental principles listed in Article II of this treaty state that signatories acknowledge the importance of migratory species being conserved and agree to take action to this end "*whenever possible and appropriate*", "*paying special attention to migratory species the conservation status of which is unfavourable and taking individually or in cooperation appropriate and necessary steps to conserve such species and their habitat*".

3.23.3 THE AGREEMENT ON THE CONSERVATION OF AFRICAN-EURASIAN MIGRATORY WATERBIRDS (AEWA) (1999)

An intergovernmental treaty developed under the framework of the Convention on Migratory Species (CMS), concerned with the coordinated conservation and management of migratory waterbirds throughout their entire migratory range. Signatories of the Agreement have expressed their commitment to work towards the conservation and sustainable management of migratory waterbirds, paying special attention to endangered species as well as to those with an unfavourable conservation status. The assessment of the ecology and identification of sites and habitats for migratory waterbirds is required to coordinate efforts that ensure that networks of suitable habitats are maintained and investigate problems likely posed by human activities.

3.24 POLICIES AND GUIDELINES

3.24.1 ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES

Relevant guidelines and policies as applicable to the management of the S&EIA process and to this application have also been taken into account, as indicated below:

- IEM Guideline Series (Series 3): Stakeholder engagement (2002);
- IEM Guideline Series (Series 4): Specialist studies (2002);
- IEM Guideline Series (Series 5): Impact Significance (2002);
- IEM Guideline Series (Guideline 5): Companion to the EIA Regulations 2010 (October 2012);
- IEM Guideline Series (Series 7): Cumulative Effects Assessment (2002);
- IEM Guideline Series (Guideline 7): Public Participation in the EIA process (October 2012);
- IEM Guideline Series (Series 7): Alternatives in the EIA process (2002);
- IEM Guideline Series (Guideline 9): Draft guideline on need and desirability in terms of the EIA Regulations 2010 (October 2012);

- DEA (2017) Guideline on Need and Desirability, Department of Environmental Affairs (DEA) Pretoria, South Africa (2017);
- IEM Guideline Series (Series 12): Environmental Management Plans (EMP) (2002); and
- IEM Guideline Series (Series 15): Environmental impact reporting (2002).

3.24.2 THE EQUATOR PRINCIPLES (EPS) III, 2013

The principles applicable to the project are likely to include:

- Principle 2: Environmental and Social Assessment;
- Principle 3: Applicable Environmental and Social Standards;
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan;
- Principle 5: Stakeholder Engagement;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent Review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: Reporting and Transparency.

These principles, among various requirements, include a requirement for an assessment process and an Environmental and Social Management Plan (ESMP) to be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards, and the appointment of an independent environmental expert to verify monitoring information.

3.24.3 SOUTH AFRICAN WIND ENERGY FACILITY GUIDELINES

The following guidelines are relevant to the proposed WEF and the potential impacts they may have on bats/avifauna and habitat that support bats/avifauna:

- South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities. 5th Edition. 2020;
- South African Best Practice Guidelines for Operational Monitoring of Bats at Wind Energy Facilities. 5th Edition. 2020;
- South African Bat Fatality Threshold Guidelines. Edition 2. 2018;
- The Species Environmental Assessment Guideline (SANBI, 2020);
- Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa. Third Edition, 2015;
- Best Practice Guidelines for Verreaux's Eagle and Wind Energy (BirdLife South Africa, 2017), and the more recent draft update of these: Verreaux's Eagles and Wind Farms (BirdLife South Africa, 2021);
- The Southern African Bird Atlas Project 2 data, available at the pentad level (<http://sabap2.adu.org.za/v1/index.php>) (accessed at www.mybirdpatch.adu.org.za);
- IUCN 2021. The IUCN List of Threatened Species. 2021 - 3. <http://www.iucnredlist.org/>;
- Wind Energy Impacts on Birds in South Africa: A Preliminary review of the results of operational monitoring at the first wind farms of the Renewable Energy Independent Power Producer Procurement Programme in South Africa. BLSA. Occasional Report Series: 2;

- On a collision course: the large diversity of birds killed by wind farms in South Africa (Perold et al. 2020);
- Birds & Renewable Energy. Update for 2019. BirdLife South Africa. Birds and Renewable Energy Forum, 10 October 2019; and
- Avian Wind Farm Sensitivity Map. Birdlife South Africa. <http://www.birdlife.org.za/conservation/birds-and-wind-energy/windmap>.

3.24.4 INTERNATIONAL FINANCE CORPORATION (IFC) PERFORMANCE STANDARDS

The IFC’s Performance Standards on Social and Environmental Sustainability (Referred to as Performance Standards hereinafter) is an environmental and social risk management tool provided by the IFC for its investment and financing clients and is also one of the major applicable standards of the Equator Principles. As the global influence of the Equator Principles has continued to rise, more and more Equator Principles Financial Institutions (EPFI) have been applying the Performance Standards in their assessments of environmental and social impacts. Under this backdrop, the Performance Standards have become the world’s leading system and tool for environmental and social risk management.

The IFC Performance Standards encompass eight topics as described in Table 3-2 below. Given that South Africa has a complex and well-balance environmental regulatory system, the IFC Performance Standards are wholly addressed in the NEMA, 1998, as amended, framework.

For reference purposes the Project Applicant, will be referred to as the ‘Borrower’ in Table 3-2.

The project will not have adverse impacts on PS5: Land Acquisition and Involuntary Resettlement and PS7: Indigenous Peoples as there is no displacement or resettlement, and none such indigenous people are found in the proposed development area of influence.

TABLE 3-2 DESCRIPTION OF THE IFC PERFORMANCE STANDARDS

PS Description	Project Applicability
<p>Performance Standard 1: Assessment and Management of Environmental and Social (E&S) Risks and Impacts</p> <p>Objective: Underscores the importance of identifying E&S risks and impacts and managing E&S performance throughout the life of a project.</p> <p>Borrowers are required to manage the environmental and social performance of their business activity, which should also involve communication between the Borrower/Investee, its workers and the local communities directly affected by the business activity. This requires the development of a good management system, appropriate to the size and nature of the business activity, to promote sound and sustainable environmental and social performance as well as lead to improved financial outcomes.</p>	<p>Section 2 of Chapter 1 of the NEMA, as amended, provides details of the environmental management principles that should be adhered to during the entire project life. Chapter 6 of the NEMA EIA Regulations, 2014 (as amended) outlines the requirements for Public Participation in respect of a project. This document represents the S&EIA process (equitable to an ESIA) undertaken for the proposed development, and comprehensively assesses the key environmental and social impacts and complies with the requirements of the NEMA EIA Regulations, 2014 (as amended). The proposed development will be managed in terms of environmental and social impacts through an approved Environmental Management Programme (EMPr) which is drafted as part of the EIA process. The following have been included as part of this Assessment:</p> <ul style="list-style-type: none"> • Description of relevant Policy;

PS Description	Project Applicability
	<ul style="list-style-type: none"> • Identification of Risks and Impacts; • EMPr (included in the EIA phase); • Requirements for Monitoring and Review; • Stakeholder Engagement as part of PPP; • External Communication and Grievance Mechanism; and • Recommendation for ongoing Reporting to Affected Communities.

Performance Standard 2: Labour and Working Conditions

Objective: Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection of basic rights for workers.

<p>For any business, its workforce is a valuable asset, and a sound worker-management relationship is a key component of the overall success of the enterprise. By protecting the basic rights of workers, treating workers fairly and providing them with safe and healthy working conditions, Borrowers can enhance the efficiency and productivity of their operations and strengthen worker commitment and retention.</p>	<p>Whilst PS 2 is applicable to the proposed development, it will not be addressed in detail in this report as Labour and Working conditions are typically addressed prior to construction, once EA has been awarded. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the Applicant.</p> <p>In terms of the proposed development, construction will require the appointment of an EPC contractor (and others) for completion.</p> <p>Appointment of contactors and employees will be 'fair and equal', and workers will be provided with a safe, healthy and inclusive work environment.</p> <p>The EMPr will incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.</p>
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Performance Standard 3: Resource Efficiency and Pollution Prevention

Objective: Recognizes that increased industrial activity and urbanization often generate higher levels of air, water and land pollution, and that there are efficiency opportunities.

<p>Increased industrial activity and urbanization often generate increased levels of pollution to air, water and land that may threaten people and the environment at the local, regional and global level. Borrowers are required to integrate pollution prevention and control technologies and practices (as technically and financially feasible as well as cost-effective) into their business activities.</p>	<p>The Project is not likely to have many large-scale and long-term impacts related to pollution.</p> <p>Measures to address air, water and land pollution will be contained in the EMPr. There are no material resource efficiency issues associated with the proposed development and the EMPr will include general resource efficiency measures.</p> <p>The project is not greenhouse gas (GHG) emissions intensive and the detailed assessment and reporting of emissions is not required. This project, however, seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy.</p> <p>The project will not release industrial effluents and waste generation will be managed according to the EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project.</p> <p>Land contamination of the site from previous land use is not a concern as the project area is mostly an agricultural area where low intensity agriculture / grazing is practiced.</p>
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PS Description	Project Applicability
<p>Performance Standard 4: Community Health, Safety, and Security Objective: Recognizes that projects can bring benefits to communities but can also increase potential exposure to risks and impacts from incidents, structural failures, and hazardous materials.</p> <p>Business activities can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials as well as impacts on a community’s natural resources, exposure to diseases and the use of security personnel. Borrowers are responsible for avoiding or minimizing the risks and impacts to community health, safety and security that may arise from their business activities.</p>	<p>The requirements for PS 4 have been addressed in this report and will be managed in accordance with the EMPr.</p> <p>It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks to communities, however a community health and safety plan should be compiled by the Applicant prior to construction to meet the requirements of IFC Performance Standard 4 (Community Health, Safety and Security). To ensure compliance with PS 4, Applicant will need to evaluate the risks and impacts to the health and safety of the affected community during the design, construction and operation of the proposed development and establish preventive measures to address them in a manner commensurate with the identified risks and impacts as contained in this report. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.</p>
<p>Performance Standard 5: Land Acquisition and Involuntary Resettlement Objective: Applies to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements.</p> <p>Land acquisition due to the business activities of a Borrowers may result in the physical displacement (relocation or loss of shelter) and economic displacement (loss of access to resources necessary for income generation or as means of livelihood) of individuals or communities. Involuntary resettlement occurs when affected individuals or communities do not have the right to refuse land acquisition and are displaced, which may result in long-term hardship and impoverishment as well as environmental damage and social stress. Borrowers are required to avoid physical or economic displacement or minimize impacts on displaced individuals or communities through appropriate measures such as fair compensation and improving livelihoods and living conditions.</p>	<p>Not Applicable</p>
<p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources Objective: Promotes the protection of biodiversity and the sustainable management and use of natural resources.</p> <p>Protecting and conserving biodiversity (including genetic, species and ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development. Borrowers are required to avoid or mitigate threats to biodiversity arising from their business activities and to promote the use of renewable natural resources in their operations.</p>	<p>In terms of protecting and conserving biodiversity, specialists have assessed the impacts of the proposed development within the area of influence and will recommend further measures to prevent/avoid/mitigate these potential impacts during the EIA phase.</p> <p>Specialist methods include a combination of literature review, stakeholder engagement and consultation, and in-field surveys. This substantively complies with the PS 6 general requirements for scoping and baseline</p>

PS Description	Project Applicability
	<p>assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.</p>
<p>Performance Standard 7: Indigenous Peoples Objective: Aims to ensure that the development process fosters full respect for Indigenous Peoples.</p>	
<p>Indigenous Peoples are recognized as social groups with identities that are distinct from other groups in national societies and are often among the marginalized and vulnerable. Their economic, social and legal status may limit their capacity to defend their interests and rights to lands and natural and cultural resources. Borrowers are required to ensure that their business activities respect the identity, culture and natural resource-based livelihoods of Indigenous Peoples and reduce exposure to impoverishment and disease.</p>	<p>Not Applicable. As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement.</p>
<p>Performance Standard 8: Cultural Heritage Objective: Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.</p>	
<p>Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.</p>	<p>A cultural heritage impact assessment and paleontological impact assessment will be undertaken for the proposed development. Consultation has been undertaken with the SAHRA and will continue during the EIA phase.</p>

4. SCOPE OF WORK AND SCOPING PHASE METHODOLOGY

The EIA process formally commences with notifying the competent authority (in this case the DFFE) of the proposed development through the submission of an application form. The EAP, along with a team of technical specialists, commence the Scoping Phase, to inform decision regarding the appropriate "scope" of the EIA phase.

The existing environmental baseline of the site proposed for development is established during this phase through a desktop assessment and site visits. The type of development is considered and its anticipated impacts on the existing environment informs the specialists' studies to be undertaken. The methodology of how these impacts should be assessed within the EIA phase is also determined.

A DSR has been compiled and was made available for public and stakeholder review and comment for a legislated period of 30 days during the period 8 January 2023 to 8 February 2024. This application has since lapsed terms of Regulation 21(1) of the NEMA EIA Regulations, as amended. As such, a new application process has been lodged which requires the DSR to be available to the public for an additional 30-day comment period from 29 February 2024 to 02 April 2024. All comments received in response to the DSR will be tabled and responded to in a Comments and Response Report, which will be attached to the FSR. The Comments and response Report will be submitted with the FSR and Plan of Study for the EIA (PSEIA) to the DFFE, as the CA approval to mark the end of the Scoping Phase.

Should the FSR be approved by the DFFE, the EIA Phase is initiated, which includes further detailed specialist assessments. A Draft EIA Report is compiled and incorporates these findings. The Draft EIA Report is made available for stakeholder and public review for a period of 30 days. Comments are again considered and responded to in a Final EIA Report.

I&APs are then notified of the submission of the Final EIA Report to DFFE.

Once a Final EIA Report has been submitted, the competent authority (the DFFE) will decide within 107 days on whether to grant or refuse Environmental Authorisation for the application.

4.1 DFFE ENVIRONMENTAL SCREENING TOOL

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

The screening report was generated based on the selected classification, i.e., Utilities Infrastructure / Electricity / Generation / Renewable / Wind. The screening report generated did not identify any Wind or Solar PV / CSP Developments which received environmental authorisation within a 30 km radius of the wind farm, furthermore, no intersections with Environmental Management Frameworks (EMF) or with any development zones were found.

Based on the selected classification to produce the screening tool report, and the environmental sensitivities of the development footprint, the screening report generates a list of specialist assessments identified for inclusion in the assessment report. It is the responsibility of the EAP

to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study.

Specialist assessments undertaken have considered the results of the DFFE Screening Tool in their terms of reference.

TABLE 4-1: ENVIRONMENTAL THEMES FROM SCREENING TOOL WHICH NEEDS TO ADHERE TO IN THE ENVIRONMENTAL AUTHORISATION PROCESS

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
Agriculture Theme		<p>Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or Solar Photovoltaic Energy Generation Facilities where the Electricity Output is 20 MW or more, gazetted on 20 March 2020. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations.</p>	High Sensitivity	High Sensitivity
			<p>Comment: The site is classified as ranging from low to high agricultural sensitivity by the screening tool. The site sensitivity verification verifies those parts of the site that are indicated as cropland in this assessment as being of high agricultural sensitivity, and the rest of the site as being of low to medium agricultural sensitivity.</p>	
Landscape / Visual Theme		<p>Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.</p>	Very High Sensitivity	High Sensitivity
			<p>Comment: According to the visual sensitivity matrix detailed in Table 4 of the Visual Scoping Report, the overall visual sensitivity of the Hugo site is rated as "High Sensitivity".</p>	
Archaeological and Cultural Heritage Theme		Site Sensitivity Verification	Low Sensitivity	Low Sensitivity

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
		Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.		
		Comment: The Archaeological scoping study has been desktop based. As such, the low rating as provided by the Environmental Screening Tool will be left as low sensitivity until an Archaeological site visit is conducted during the EIA phase to either confirm or dispute this.		
Noise Theme		Protocol for specialist assessment and minimum report content requirements for Noise Impacts, gazetted on 20 March 2020.	Very High Sensitivity	Very High Sensitivity
		Comment: There are permanent or temporary residential activities, and these locations are located within 2,000m from the area where wind turbines may be developed. These residential activities are considered to be noise-sensitive and the areas are considered to have a "Very High" sensitivity to noise.		
Flicker Theme		Verification requirements where a specialist assessment is required but no Specific Assessment Protocol has been prescribed, gazetted 20 March 2020.	Very High Sensitivity	Not Determined
		Comment: No flicker assessment has been / will be undertaken for the scoping phase. The outcome of the noise assessment / visual study will assist the EAP in the flicker assessment during the EIA phase of the development.		
Palaeontology Theme		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Very High Sensitivity	Very High Sensitivity
		Comment:		

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
		<p>This development area was allocated a rating of Very High Sensitivity by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. Since the palaeontological study was desktop based during the scoping phase, the rating allocated by SAHRIS and the Screening Tool shall remain until a site verification can be done during the EIA phase.</p>		
Terrestrial Biodiversity Theme		Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Terrestrial Biodiversity, gazetted on 20 March 2020.	Very High Sensitivity	Medium Sensitivity
		<p>Comment: The site is predominantly classified as Low Sensitivity by the Department of Forestry, Fisheries and the Environments (DFFE) Online Screening Tool (ST), while remaining areas are classified as Very High Sensitivity. This is due to the intersection of the PAOI with various important biodiversity areas including Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA) and Freshwater Ecosystem Priority Areas (FEPA) associated with the Langeberg-Wes Mountain Catchment. It is the Specialist's opinion that the DFFE Online ST assessment of Very High Sensitivity in the Terrestrial Biodiversity Theme is correct, and a Specialist EIA Report must be submitted.</p>		
Aquatic Biodiversity Theme		Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Aquatic Biodiversity, gazetted on 20 March 2020.	Very High Sensitivity	Low Sensitivity
		<p>Comment: The DFFE Screening Tool identified two sensitivity ratings within the development footprint, namely, Low and Very High. There is overlap with the findings on site and the Screening Tool's outcome, thus the development footprint must be developed with cognisance of these sensitivities.</p> <p>Therefore, environmental sensitivity input received from the aquatic ecology specialist will be taken forward and considered within the EIA process and the impact to these areas assessed. Appropriate layout and development restrictions will be implemented within the development footprint to ensure that the impact to aquatic ecology is deemed acceptable by the aquatic ecologist.</p>		

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
Avian Theme		Protocol for the specialist assessment and minimum report content requirements for the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).	Low Sensitivity	High Sensitivity
		<p>Comment: The DFFE Screening Tool (Animal Theme) classified the area as of High Sensitivity (based on the presence of four Red Data species). Birdlife South Africa’s national Avian Sensitivity Map suggests low to medium-high sensitivity for birds and wind farms. Inspection of the national bird atlas data set (SABAP 2) including our own species records added an additional Red Data species (Lanner Falcon Falco biarmicus) and other collision-prone species. We, thus, concur with the Screening Tool’s assessment that the site is of High Sensitivity, and the data and models that follow allow us to reduce risk by constructing a detailed spatial picture of the risks to the Priority birds present.</p>		
Civil Aviation Theme		Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Civil Aviation Installations, gazetted on 20 March 2020.	High Sensitivity	High Sensitivity
		<p>Comment: The Screening Tool Report indicated that there are Civil Aviation Installations within 8km of the proposed development. As such, the Civil Aviation Theme is allocated a High Sensitivity rating. The Civil Aviation Authority has requested that the Project Proponent applies or Obstacle approval by following the process outlined in their website. This will be done as required prior to the commencement of construction activities.</p>		
Defence Theme		Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Defence Installations, gazetted on 20 March 2020.	Medium Sensitivity	Low Sensitivity

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
			<p>Comment: Site verification confirms the medium sensitivity. During the public consultation, the South African National Defence Force (SANDF) will be consulted by the EAP / Project Applicant to confirm that there will be no impact on the defence installation of the development area and immediate surrounds.</p>	
Radio Frequency Interference (RFI) Theme		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
			<p>Comment: Site verification confirms the low sensitivity. During the public consultation, the South African Radio Astronomy Observatory (SARAO) will be consulted by the EAP / Project Applicant to confirm that there will be no impact on the Radio Frequency Interference (RFI) within the immediate surrounds of the development.</p>	
Geotechnical Theme		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined	Not Determined
			<p>Comment: Geotechnical assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. The EAP is of the opinion that a Geotechnical Assessment for the development can and will only be undertaken prior to the commencement of the construction phase. The EAP has not included this assessment as part of the application process.</p>	
Plant Species Theme		Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant Species, gazetted on 20 March 2020.	Medium Sensitivity	Medium Sensitivity
			<p>Comment: Following the reconnaissance site visit and desktop study, it is the specialist's opinion that the DFFE Screening Tool's</p>	

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
		assessment of the proposed Khoe WEF PAOI as being of predominantly Medium Sensitivity, followed by Low Sensitivity and a small section of High Sensitivity in the Plant Species Theme is accurate.		
Animal Species Theme		Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal Species, gazetted on 20 March 2020.	High Sensitivity	High Sensitivity
		<p>Comment: The National Web-based Screening Tool identified portions of the site to be of High Sensitivity in the Animal Species Theme due to two avifaunal species, namely Verreaux's Eagle (<i>Aves – Aquila verreauxii</i>) and Black Harrier (<i>Aves – Circus maurus</i>). The remaining portions of the site was mostly identified to be of Medium Sensitivity due to the potential presence of those same avifaunal species, as well as the Caledon Copper butterfly (<i>Insecta – Aloeides caledoni</i>) and Riverine Rabbit (<i>Mammalia – Bunolagus monticularis</i>).</p> <p>A separate avifaunal species specialist study has been initiated to investigate the relevance of the proposed site to birds, these species will therefore not be contemplated further.</p>		
Bats Animal Theme		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	High Sensitivity	The bat sensitivity zones still need to be refined, incorporating data from the whole monitoring year. At the moment, only high sensitivity zones have been identified. There will be some changes in sensitivity zones however once the monitoring year is over.
		<p>Comment: The outcome of the SSV is that the overall sensitivity of the site varies by bat species and season, linked to their relative activity levels. However, the two sensitivities are based on different data types. The Screening Tool is based on broad scale habitat data whereas the SSV is based on bat collision</p>		

Identified Assessment	Specialist	Assessment Protocol	Identified Sensitivity	
			By DFFE Screening Report	By Specialist / EAP
			risk with wind turbines derived from activity data collected within the project boundary, and is therefore a better approximation of the project sensitivity because collision is the primary impact.	
Socio-Economic Assessment		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined.	Not Determined.
			<p>Comment: Socio-economic assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. Following the scoping assessment and verification, it is recommended that a full Social Impact Assessment be undertaken by a social specialist.</p>	
Traffic Assessment		Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	Not Determined	Medium to Low Sensitivity
			<p>Comment: Traffic assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. A desk-based traffic assessment was undertaken for the proposed development as well as a site visit. The outcome of the specialist assessment confirms that the current farming activity and the environmental sensitivity of the proposed development, from a traffic and transportation perspective is medium to low.</p>	

4.2 SPECIALIST SCOPING METHODOLOGY

To evaluate the potential preliminary environmental impacts and verify the sensitivity of the screening report, information relating to the existing environmental conditions was collected through field and desktop research, this is known as the baseline.

Each of the specialist assessments followed a systematic approach to the assessment of impacts, with the key steps being:

- Description of existing environment/baseline conditions;
- Site Sensitivity Verification;

- Prediction of likely potential impacts, including cumulative impacts (both positive and negative), where relevant;
- Plan of Study for the EIA Phase, and
- Summary of findings and recommendations.

The methodology each specialist used to collate their report is summarised below.

4.2.1 SOIL AND AGRICULTURAL POTENTIAL

The assessment was based on an on-site investigation of the soils and agricultural conditions and 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.

The site investigation was conducted on 24 October 2023. An interview was also conducted with the farmer for information on farming practices on 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 (Soil Classification Working Group, 1991).

This level of soil assessment is considered entirely adequate for an understanding of on-site soil potential for the purposes of a wind farm assessment. For this purpose, only an understanding of the general range and distribution patterns of different soil conditions across the site is required. A more detailed soil survey would be extremely time-consuming and impractical to conduct, given the very large assessment area, and would not provide any additional data that would add value to the assessment of the agricultural impact of a wind farm.

This is because a wind farm extends over a very large surface area. The layout design of a wind farm is complex and there are multiple interacting factors that determine the turbine locations that will ensure the viability of the wind farm. Each turbine influences the amount of wind that the other turbines receive. Therefore, the location of one turbine cannot simply be shifted without requiring other turbines to be shifted as well, to retain the viability of all the turbines. To shift turbines to account for variation in soil conditions would be extremely complex and would require a level of soil mapping detail across the whole wind farm area that would be practically impossible to achieve.

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the fact that the assessment was done in spring season has no bearing on its results. The level of agricultural assessment is considered entirely adequate for an understanding of on-site agricultural production potential for the purposes of this assessment.

4.2.2 NOISE

The scoping assessment was based on a desktop assessment, as well as a basic predictive model to identify potential issues of concern. The site was visited on 12 and 20 December 2022, as well as 4 to 8 September 2023. Ambient sound levels were measured during this period at a

total of seven (7) locations, resulting in more than 3,900 daytime and 1,900 night-time measurements.

Each measurement was collected over a 10-minute period and included a number of sound level descriptors, including - equivalent values, minimum and maximum levels, statistical sound levels as well as spectral information. Confidence levels in the resulting data are high and it is expected that the ambient sound level data would be applicable to the larger area.

A site sensitivity verification has been undertaken in accordance with Appendix 6 of the NEMA EIA Regulations of 2014, to confirm the current land use and environmental sensitivity within the potential project area. The site was initially assessed using the National Environmental Screening tool, available at, <https://screening.environment.gov.za>. The output from the National Online Screening tool indicates a number of areas within and up to 2,000 m from the project boundary to be considered to be of a "very high" sensitivity to noise. These potentially "very high" sensitive areas (in terms of noise) are indicated on Figure 4-1. The site visits revealed that not all of these locations are noise sensitive, with no residential structures or activities associated with these areas. Potential structures or locations associated with permanent or temporary residential activities were identified and indicated with green markers on Figure 4-1.

Note that a full noise assessment will be undertaken for the EIA phase of the Project.

FIGURE 4-1: AREAS IDENTIFIED BY THE ONLINE SCREENING TOOL TO HAVE A "VERY HIGH" SENSITIVITY TO NOISE

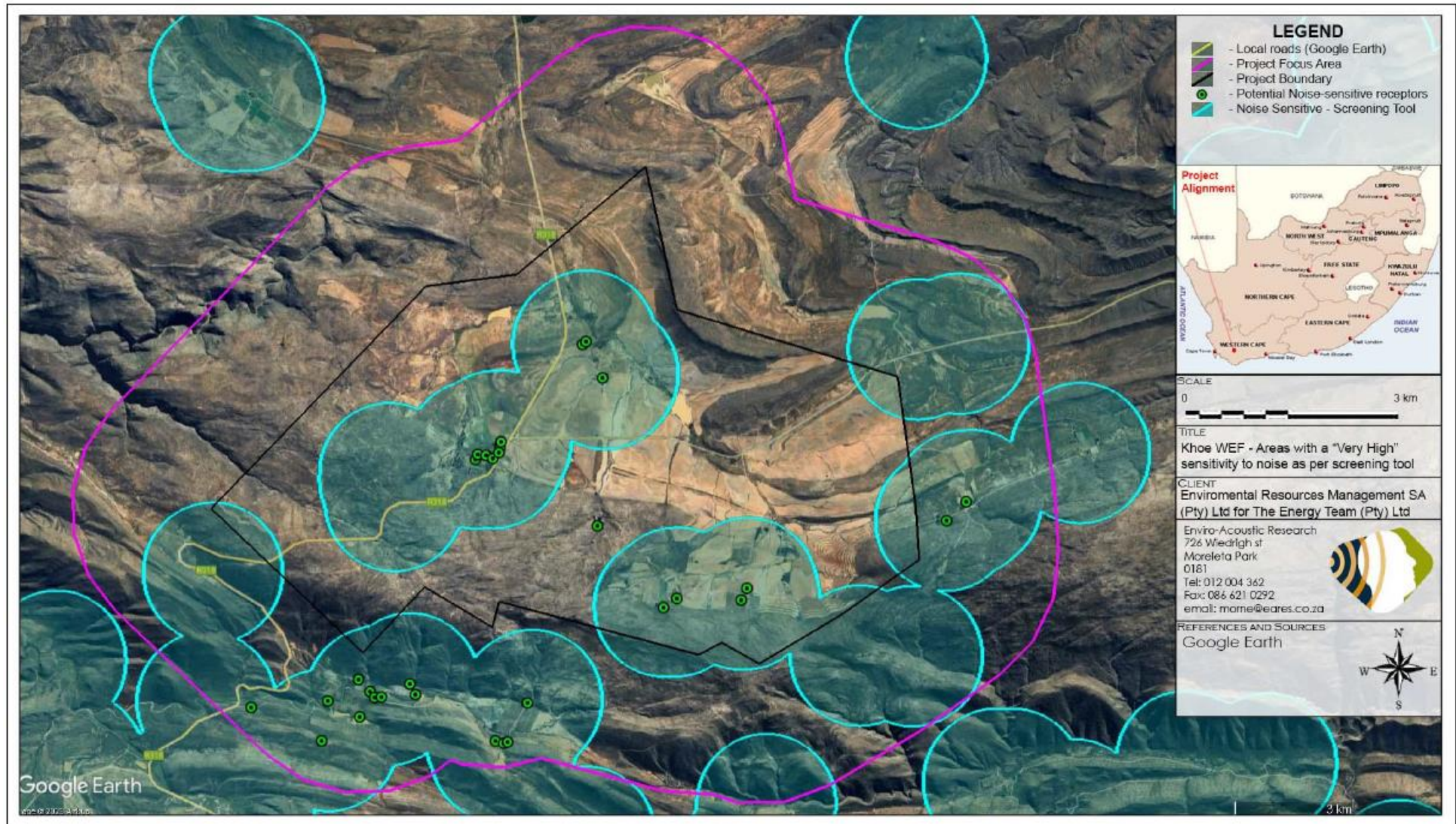
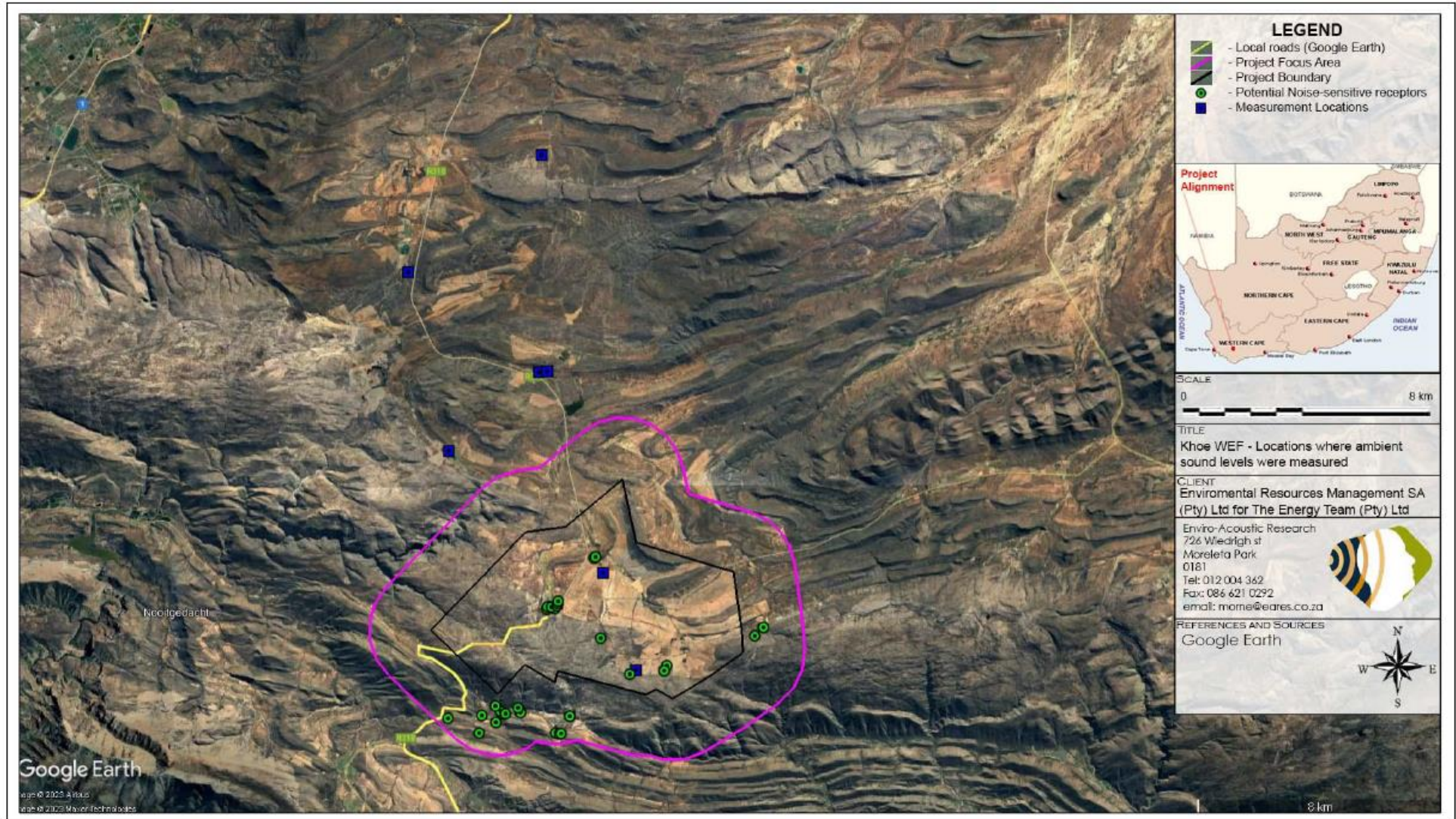


FIGURE 4-2: LOCATIONS WHERE AMBIENT SOUND LEVELS WERE MEASURED



4.2.3 FRESHWATER AND WETLANDS (AQUATICS)

This study followed the approaches of several national guidelines with regards to wetland assessment. These have been modified by the Aquatic Specialist, to provide a relevant mechanism of assessing the present state of the study area aquatic systems, applicable to the specific environment and, in a clear and objective manner, identify and assess the potential impacts associated with the proposed development site based on information collected within the relevant farm portions.

Current water resource classification systems make use of the Hydrogeomorphic (HGM) approach, and for this reason, the National Wetland Classification System (NWCS) approach will be used in this study. It is also important to understand the legal definition of a wetland, the means of assessing wetland conservation and importance and the relevant legislation aimed at protecting wetlands.

To assess the PES or condition of the observed wetlands, a modified Wetland Index of Habitat Integrity (DWAF, 2007) was used. The Wetland Index of Habitat Integrity (WETLAND-IHI) is a tool developed for use in the National Aquatic Ecosystem Health Monitoring Programme (NAEHMP), formerly known as the River Health Programme (RHP). The output scores from the WETLAND-IHI model are presented in the standard DWAF A-F ecological categories and provide a score of the PES of the habitat integrity of the wetland system being examined. The Aquatic specialist has included additional criteria into the model-based system to include additional wetland types. This system is preferred when compared to systems such as WET-Health – wetland management series (WRC 2009), as WET-Health (Level 1) was developed with wetland rehabilitation in mind and is not always suitable for impact assessments. This coupled with the degraded state of the wetlands in the study area, indicated that a complex study approach was not warranted, i.e. conduct a Wet-Health Level 2 and WET-Ecosystems Services study required for an impact assessment.

4.2.4 TERRESTRIAL BIODIVERSITY

4.2.4.1 FAUNA

Desktop Study

The desktop study included data obtained from the following sources:

- Broad vegetation types present on the project site were obtained from the updated National Vegetation Map 2018 (NVM 2018) database⁷ and the vegetation descriptions were obtained from Mucina & Rutherford (2006)⁸;
- Output from the National Web-based Screening Tool⁹;
- Virtual Museum¹⁰;

⁷ South African National Biodiversity Institute (2006-2018). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Online, <http://bgis.sanbi.org/Projects/Detail/186>, Version 2018 accessed January 20 2020.

⁸ Mucina, L. and Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland, in *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

⁹ <https://screening.environment.gov.za/>

¹⁰ <http://vmus.adu.org.za>

- iNaturalist¹¹;
- Global Biodiversity Information Facility (GBIF)¹²;
- Publicly available satellite imagery;
- IUCN Red List of Threatened Species¹³; and
- Red List of South African Species¹⁴.

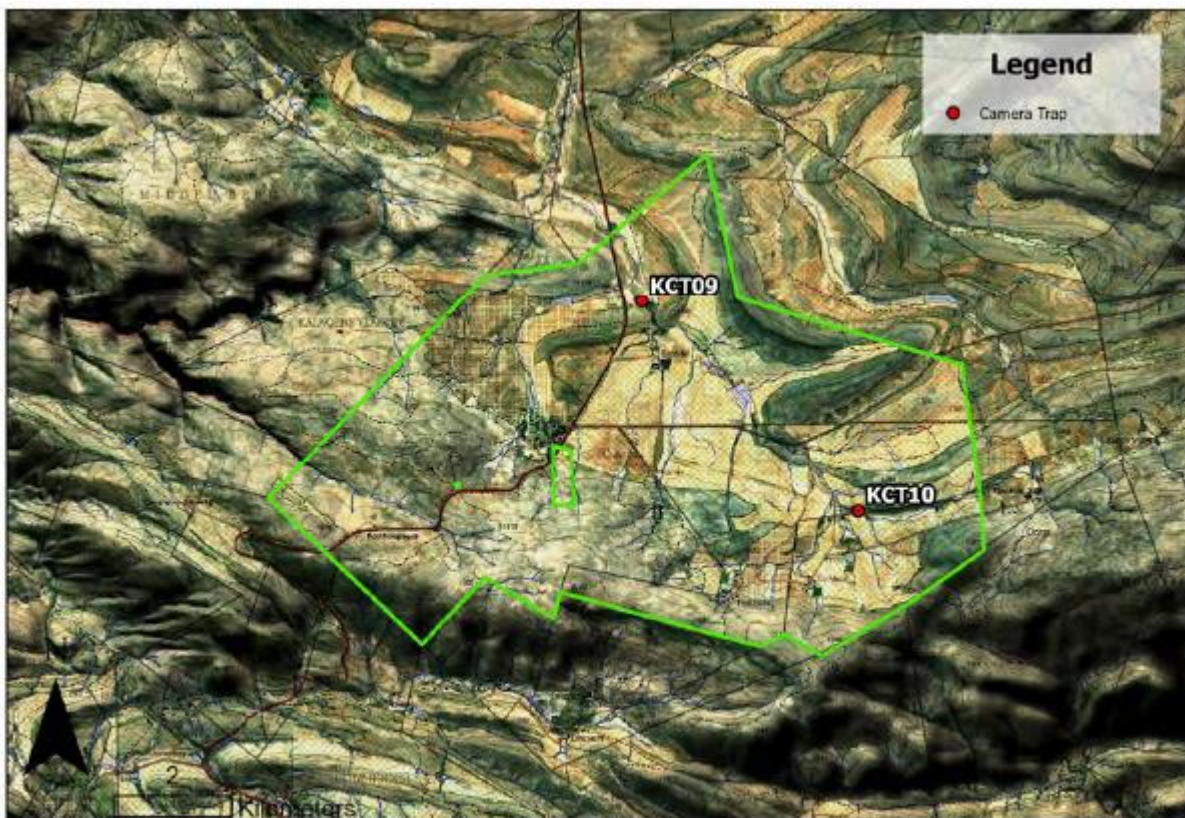
Site Visit and Camera Survey

Two (2) camera traps were deployed on 17 February 2022 and decommissioned on 23 December 2022. Camera trap locations were determined based on specialist determination of habitat suitability for Riverine Rabbit. Over and above setting the camera trap, the site inspection was sufficient to determine the current land-use in the area.

Sampling

Sampling sites were positioned within small strips of remaining natural or near-natural vegetation, in low-lying areas identified by the National Web-based Screening Tool to potentially support Riverine Rabbit. Representative sites with the highest likelihood of Riverine Rabbit were selected amongst those available across the site, nevertheless the likelihood of Riverine Rabbit being present remained low in the specialist’s experience (Figure 4-3).

FIGURE 4-3: CAMERA TRAP SURVEY SAMPLING LOCATIONS



¹¹ <https://www.inaturalist.org>

¹² <https://www.gbif.org/>

¹³ <https://www.iucnredlist.org/>

¹⁴ <http://speciesstatus.sanbi.org/>

Sampling Conditions

Sampling was conducting through a wide-range of conditions experience between 19 February 2022 and 22 December 2022, including summer, autumn, winter and spring.

Sampling Effort

Camera traps were deployed across the site for a combined 612 camera trap days.

The findings of the Terrestrial Biodiversity assessment are detailed in Section 5.1.5 and Section 11.4 of this report.

4.2.4.2 FLORA

Desktop Study

The desktop study was initiated by obtaining the proposed development area's expected sensitivity in the Plant Theme using the DFFE Online Screening Tool (ST)¹⁵. The recorded land-use of the proposed Project Area of Influence was determined using the latest available South African National Land Cover (SANLC, 2020)¹⁶ spatial datasets and Quantum Geographic Information System (QGIS). These data were compared with previously identified important biodiversity areas in proximity by consulting the following resources:

- The Red List of Ecosystems (RLE, 2022) spatial dataset¹⁷ to determine the Red List Status and Category of ecosystem(s) within the proposed Project Area of Influence.
- The Langeberg Key Biodiversity Areas (KBA) spatial dataset¹⁸ was used to determine the presence of Critical Biodiversity Areas (CBA1/2), Ecological Support Areas (ESA1/2), Protected Areas (PA) and Other Natural Areas (ONA) within the proposed Project Area of Influence.
- The SANBI 2018 Beta Vegetation Map of South Africa, Lesotho and Swaziland Spatial Dataset¹⁹ to determine the Vegetation Units present within the proposed Project Area of Influence.

In addition, the resources below were consulted to compile a list of plant Species of Conservation Concern (SCC) that are potentially present within the proposed development area footprint:

- The SANBI Plants of Southern Africa (POSA) Brahms database²⁰ to identify plant species that have been recorded in the proposed Project Area of Influence.
- The Biodiversity and Development Institute's Virtual Museum database²¹ to determine the presence of plant species that have been recorded in the proposed Project Area of Influence.
- The Global Biodiversity Information Facility (GBIF) database²² to determine the presence of plant species that have been recorded in the proposed Project Area of Influence.
- The SANBI Red List of South African Species²³ to confirm the national Red List Status and Category of plant species that have been recorded in the proposed Project Area of Influence.

¹⁵ <https://screening.environment.gov.za/screeningtool/#/pages/welcome>

¹⁶ <https://egis.environment.gov.za/sa-national-land-cover-datasets>

¹⁷ <http://bgis.sanbi.org/SpatialDataset/Detail/6715>

¹⁸ <http://bgis.sanbi.org/SpatialDataset/Detail/629>

¹⁹ <http://bgis.sanbi.org/SpatialDataset/Detail/670>

²⁰ <https://posa.sanbi.org/sanbi/Explore>

²¹ <https://vmus.adu.org.za/>

²² <https://www.gbif.org/>

²³ <http://speciesstatus.sanbi.org/>

- The Red List of South African Plant Species²⁴ to confirm the national Red List Status and Category of plant species that have been recorded in the proposed Project Area of Influence.
- The International Union for the Conservation of Nature’s (IUCN) Red List²⁵ to confirm the international Red List Status and Category of plant species that have been recorded in the proposed Project Area of Influence.

Site Verification

The specialist spent two days on site (28 – 29 June 2022) in conjunction with the terrestrial animal specialist retrieving camera trap data and replacing Secure Digital (SD) memory cards to verify the sensitivity of the proposed study area as described the DFFE Online Screening Tool, and land-use as described by SANLC.

Site Ecological Importance

Habitat sensitivity is determined as a function of several factors including the presence and distribution of SCC, intactness of habitat, extent of impacts, and the capacity of the habitat to withstand and/or recover from disturbance. These factors are assessed on a scale from ‘Low’ to ‘Very High’ according to pre-determined conditions and incorporated into a formula to determine the Site Ecological Importance (SEI) for each habitat. Full methodology can be found in Appendix A. How the different SEI outcomes relate to any proposed development is described in Table 4-2 below.

TABLE 4-2: INTERPRETING SITE ECOLOGICAL IMPORTANCE OUTPUTS.

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	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 targets remain.
High	Avoidance mitigation wherever possible. Minimization 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.
Medium	Minimization and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimization and restoration mitigation – development activities of medium to high impact

²⁴ <http://redlist.sanbi.org/index.php>

²⁵ <https://www.iucnredlist.org/>

Site Ecological Importance	Interpretation in relation to proposed development activities
	acceptable followed by appropriate restoration activities.
Very Low	Minimization mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

4.2.5 AVIFAUNA

As part of the protocol a Screening Site Assessment of the proposed Khoe WEF must be undertaken. This was carried out in summer (February) 2022 by the Avifauna specialist, to determine if the site had any fatal flaws from an avian perspective. This was required because it lies outside any REDZ.

The study took place over two days (10 and 11 February 2022) and was combined with the first pre-construction site visit in January 2022 (when the site was smaller, prior to additional farms being added²⁶). This allowed an initial snap-shot avian survey of the proposed Khoe WEF in the Cape Fold mountains south of De Doorns. Short Vantage Point observations of 1-2 hours were undertaken by the specialist team whilst driving and walking all areas of the proposed Khoe site.

4.2.5.1 DATA SOURCES AND GUIDELINES

The DFFE Screening Tool was accessed as a first step to identifying if the proposed wind farm site is sensitive to development for birds. The online site was accessed 5 May 2023 and the results presented in Appendix 2

<https://screening.environment.gov.za/screeningtool/#/pages/welcome>

As a part of the DFFE defined protocol we must compare the results of the Screening Tool with the results presented here.

- For the Scoping study we accessed the Southern African Bird Atlas Project (SABAP2) national bird database. This is high-resolution bird atlasing database available online through the Animal Demography Unit at University of Cape Town and downloaded from http://sabap2.adu.org.za/map_interactive.php. This typically allows an up to date bird species list from 2011 to present. The pentads accessed allow an overall species list and a reporting rate (a measure of the likelihood of occurrence). Note that while the data collected on site and analysed via the CRM far exceeds the results presented in SABAP, we have presented it for completeness.
- The ranking of Priority collision-prone species (CPS) was drawn from the BARESG tabulation given in Ralston et al. (2017). We considered only the top 100 collision-prone species as Priority species. The sensitivity of these Priority birds to wind farms was sourced from the Birdlife South Africa website site here <http://www.birdlife.org.za/conservation/terrestrial-bird-conservation/birds-and-renewable-energy/wind-farmmap> Among these Priority species are Red Data species that require special attention.

²⁶ The proposed project areas was initially smaller prior to the commencement of the Avifaunal studies. Two farm portions were added into the initial project area.

- Red Data species conservation status, and the Red Data classification in South Africa, was sourced from Taylor et al. (2015).
- Important Bird Area (IBA) data were collated from Marnewick et al. (2015) and available at <http://www.birdlife.org.za/conservation/important-bird-areas/documents-and-downloads>
- The Birdlife South Africa guidelines for monitoring birds at wind farms (Jenkins et al. 2015) was followed, as well as the guidelines for Red Data species found breeding nearby.

Black Harrier: Simmons et al. 2020, <https://www.birdlife.org.za/wp-content/uploads/2020/09/Black-Harriers-Wind-Energy-Final-1.pdf>)

Verreaux's Eagle: Ralston-Paton and Murgatroyd 2021
<https://www.birdlife.org.za/wpcontent/uploads/2022/08/Verreauxs-Eagle-and-Wind-Energy-2021-2nd-edition.pdf>

The results are summarised in Section 5.1.5.3 and Section 11.5 below.

4.2.6 BATS

Similar to Avifauna monitoring, Bat monitoring will take place over a period of 12 months. Bat monitoring started in December 2022, when the Met mast was installed, and the last data was collected on 13 August 2023. A desktop study was undertaken of the site, using the information provided by the developer, as well as information gathered through a literature review. Conservation areas in the vicinity were investigated and information from other developments in the area, particularly renewable energy projects and wind farms, were noted to discuss cumulative effects in the upcoming EIA report. Relevant guidelines and legislation were also consulted. The study area was visited to further inform the background assessment of the site. During seasonal fieldwork sessions, physical surveys were conducted to identify the location of possible roosts. Interviews were also conducted with people staying on site or close to the site, to establish if they are aware of roosts in the vicinity, or general bat occurrences.

4.2.6.1 STATIC ACOUSTIC MONITORING

Static monitoring, using automated bat detector systems, provided data about the bats present on the site. The number of detectors required was calculated based on the surface area of the proposed site and the various biotopes. Measurements were taken at various fixed locations and varying altitudes, as representative of the area in general and of each biotope present within the proposed study area (Figure 4-4). Static monitoring is essential in assessing the relative importance and temporal changes of features, locations, and potential migratory routes (MacEwan, et al., 2020). The monitoring systems deployed in the study area consist of six Wildlife Acoustics SM4BAT full spectrum bat detectors powered by 12V 7 Amp-h sealed lead acid batteries replenished by photovoltaic solar panels (see Volume II for a detailed account of the detectors placed on site). Two SD memory cards, class 10 speed, with a capacity of 64 GB or 128 GB each were utilized in each detector to ensure substantial memory space with high-quality recordings, even under conditions of multiple false environmental triggers.

FIGURE 4-4: POSITION OF BAT MONITORING SYSTEMS

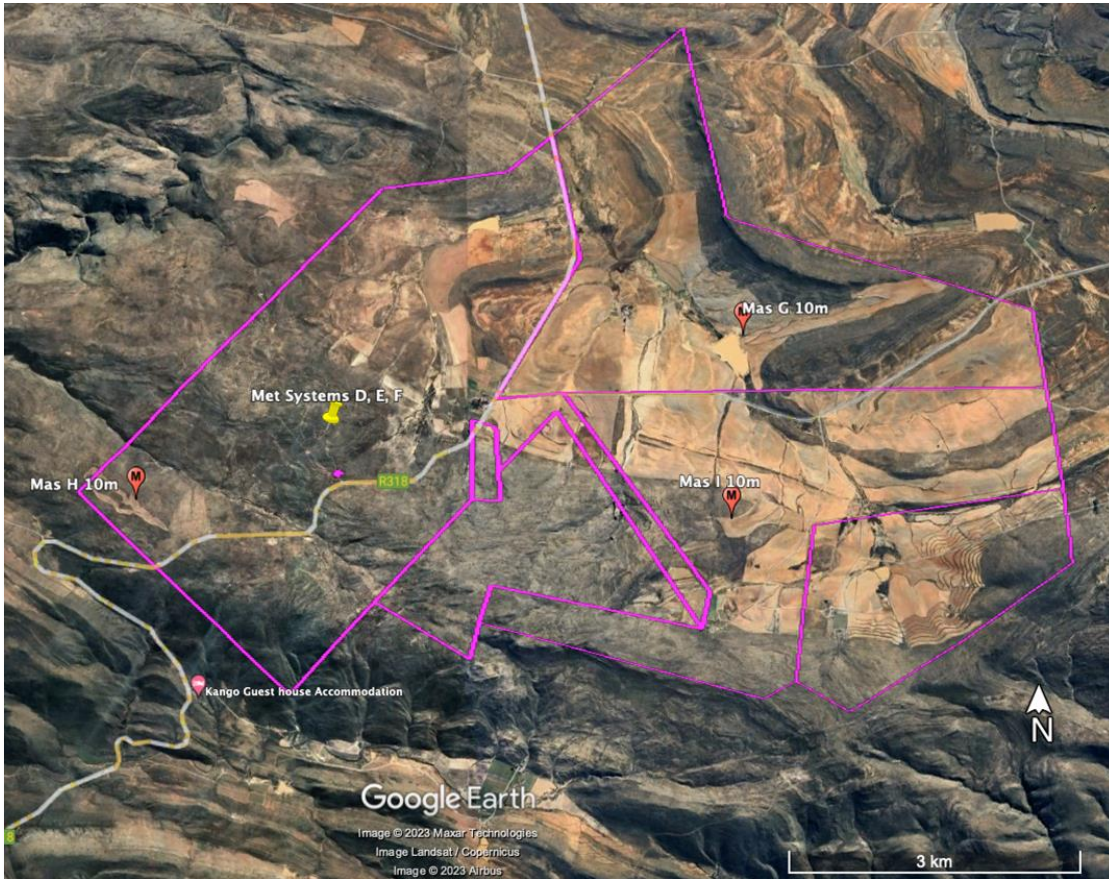


FIGURE 4-5: SYSTEMS DEPLOYED ON THE MET MAST



Each detector was set to operate in continuous trigger mode from dusk each evening until dawn. Times were correlated with latitude and longitude, to trigger half an hour before sunset. The trigger mode setting for the bat detectors, which record frequencies exceeding 16kHz and -18dB,

was set to record for the duration of the sound, and 1,000 ms after the sound ceased. This period is known as the trigger window.

The data from these recorders are downloaded every three to four months and analysed to provide an approximation of the bat frequency and diversity of species that visit and/or inhabit the site.

The position of the Met mast was determined by the developer and the bat monitoring systems on the Met mast represent the biotope associated with the undulating hills covered by North Langeberg Sandstone Fynbos (SANBI, 2012), while the positions of temporary bat monitoring masts were selected based on the representation of different biotopes, proximity to possible bat conducive areas, and accessibility to install a mast and download data.

4.2.6.2 ROOST SURVEYS

Roost surveys were conducted when the bat specialist visited the site. While areas, where possible roosts could be situated, were investigated, all roosting areas are not accessible as bats sometimes roost in crevices or roofs with limited ceiling space. When day roosts are identified, bat counts are conducted at sunset and if deemed necessary, detectors are installed for short periods at point sources to monitor roosts. It should be noted that the site is large and roost searches are concentrated in areas where one would expect bats to roost. Within the 12 months and limitations of the bat monitoring study, some bat roosts might not be discovered. Up to now, no roosts have been discovered yet.

4.2.6.3 MANUAL SURVEYS – DRIVEN TRANSECTS

Less emphasis is given to transects in the current guidelines, while more focus is placed on point sources. Manual activity surveys, such as driven transects, could provide additional spatial understanding of the bat species utilising the site. This is especially the case for the identification of key features, potential commuting routes, and overall activity within and surrounding the site. Transects complement static monitoring surveys in terms of spatial coverage. No transects have been performed during the scoping phase but transects will be conducted in the upcoming summer season.

A SM4BAT full spectrum recorder with a microphone mounted on a pole is used for transects. Starting at sunset up to approximately two hours after sunset, the vehicle was driven at a speed between 10 to 20 km/h along a set route. As far as possible, transect routes were kept the same to allow for the comparison of data.

4.2.6.4 POINT SOURCES

A SM4BAT full spectrum recorder is used during point sources, where the detector is placed for one night at a place where there is expected to be optimum bat activity. In March 2023 a detector was placed next to a large farm dam, close to the Sandvlei dwellings. Up to now the weather was quite cold during site visits. Bats are more active during warmer weather and more point source recordings will be conducted during the summer of 2023 and 2024.

4.2.6.5 DATA ANALYSIS

Data was downloaded manually approximately once every three to four months. Acoustic files downloaded from the detectors were analysed for bat activity with respect to the bat activity and the bat species. The latest version of Wildlife Acoustics Kaleidoscope Pro was used for

analysing large quantities of data. In cases where there was uncertainty about details of a call (which is confirmed as a bat calling), the call was classified as Unclear.

The findings of the Bat survey are detailed in Section 5.3 and Section 11.6 of this report.

4.2.7 SOCIO-ECONOMIC

The approach to the Scoping Level Socio-economic Impact Assessment (SIA) study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on IBP.

In this regard the study involved:

- Review of socio-economic data for the study area.
- Review of relevant planning and policy frameworks for the area.
- Review of information from similar studies, including the SIAs undertaken for other renewable energy projects in the study area.
- Site visit.
- Identification and assessment of the social issues associated with the proposed project.

Interviews with key stakeholders and interested and affected parties will be undertaken during the assessment phase. The findings of the socio-economic assessment are detailed in Section 5.4 and Section 11.7 of this report.

4.2.8 HERITAGE AND PALAEOLOGY

This scoping report aims to provide a general description of the known and potential heritage sensitivities of the project site and to flag any heritage-related fatal flaws to the proposed development of the Khoe WEF, together with draft opportunities and constraints for the proposed project.

This scoping assessment was purely desktop based and relies on a range of primary and secondary information to provide a high-level assessment of the potential paleontological, archaeological and historical built environment sensitivity of the development site.

The sources of information used are shown in Table 4-3 below and include published archaeological papers and reports for the general project area and unpublished archaeological and heritage impact assessments that have been undertaken in the vicinity of the project site.

TABLE 4-3: INFORMATION SOURCES USED IN THIS ASSESSMENT

Data/Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Geological chart	Council for Geoscience	Various	Spatial	Current 1:250 000 geological survey chart for the area

Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Cape Farm Mapper	Current	Spatial	Cadastral boundaries, extents and aerial photography
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Paleontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing paleontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

Together, these information sources have allowed a description of the heritage potential of the project site (Section 5.5) and the identification of potential high level heritage impacts (Section 10.8).

4.2.9 VISUAL/ LANDSCAPE

The scoping report was undertaken using Geographical Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from topographical data provided by the Japan Aerospace Exploration Agency (JAXA), Earth Observation Research Centre, in the form of the ALOS Global Digital Surface Model "ALOS World 3D – 30m" (AW3D30) elevation model.

The approach used to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment.
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc..
- The identification of sensitive environments upon which the proposed facility could have a potential impact.

- The creation of viewshed analyses from the proposed project site to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses considering the dimensions of the proposed structures and activities.
- A site visit was undertaken on the 6th of September 2023 to verify the results of the spatial analyses and to identify any additional site-specific issues that may need to be addressed in the visual impact assessment (VIA) report. It should be noted that, from a visual perspective, the different seasons do not influence the results of the impact assessment, and as such regardless of the timing of the site visit, the level of confidence for the assessment and findings is high.

4.2.9.1 VISUAL DISTANCE AND OBSERVER PROXIMITY

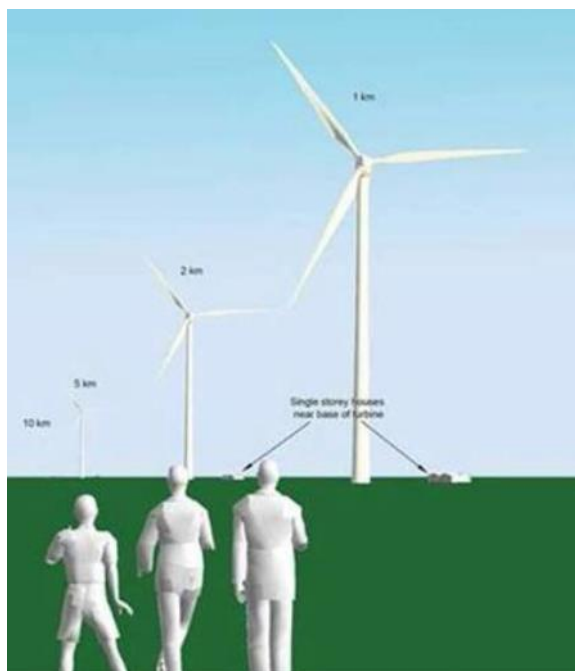
Proximity offsets (the radial distance between the proposed development and the identified visual receptors) were determined based on the anticipated visual experience of the observer over varying distances. In general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed infrastructure. Therefore, to refine the visual exposure of the facility on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the Khoe WEF. Proximity offsets for the proposed development footprint are thus established to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

These proximity offsets are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e., depending on the size and nature of the proposed infrastructure). This rationale was developed in the absence of any known and/or acceptable standards for South African WEFs. Therefore, for the purpose of this study, proximity offsets have been calculated from the expected boundary of the site, as indicated on Figure 11-6 and as follows:

- 0 – 5 km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 5 – 10 km. Short to medium distance view where the structures would be easily and comfortably visible and constitute a high to moderate visual prominence.
- 10 – 20 km. Medium to long distance view where the facility would become part of the visual environment but would still be visible and recognizable. This zone constitutes a moderate visual prominence.
- 20 km. Long-distance view of the facility where the structures are not expected to be immediately visible and not easily recognizable. This zone constitutes a lower visual prominence for the facility.

The figure below helps to place the above explanations in context, illustrating what scale a turbine structure will be perceived at different viewing distances. The findings of the visual assessment are detailed in Section 5.6 and Section 11.9 of this report.

FIGURE 4-6: VISUAL EXPERIENCE OF A WIND TURBINE STRUCTURE AT A DISTANCE OF 1 KM, 2 KM, 5 KM AND 10 KM



4.2.10 TRAFFIC

A desktop study and site visit were conducted to understand the existing receiving environment of the potential sites. The sites were then evaluated based on their advantages and disadvantages in terms of traffic and transportation, particularly relative to available access and infrastructure of the existing road network. The potential traffic and transport related impacts were then identified for future assessment and the data collection and consultation requirements for the full Impact Assessment were determined. This information can be used as input into the wider scoping assessment and evaluation of the sites from the perspective of other disciplines, for the selection of the final site.

The site visit was conducted on Friday, 06 October 2023 for purposes of identifying any fatal flaws with respect to various aspects including traffic and transportation. The site visit included a high-level evaluation of the current local transportation infrastructure network in the vicinity of proposed Khoe WEF development sites. The findings were recorded by way of reporting the Site Sensitivity/Site Visit (See Section 11.10) and will be used as a basis for the design layout.

5. DESCRIPTION OF THE BASELINE ENVIRONMENT

To evaluate the potential E&S impacts, information relating to the existing environmental conditions or baseline environment is collected through field and desktop research. The baseline environment also extends into the future, although predictions of any changes can involve a high number of variables and may be subject to potentially large uncertainties. As a result, in most cases, the baseline is assumed to remain unchanged throughout the operation of the development. Where this is not the case, this is stated.

The baseline environment has been used to identify any potential sensitive receptors on and near the site, and it is used to assess what changes may take place during the construction, operation and decommissioning phases of the development and the effects, if any, that these changes may have on these receptors.

Within each technical assessment, the methods of data collection are discussed with the relevant specialists. Data is also collected from public records and other archive sources and where appropriate, extensive field surveys are carried out. The timing/seasonality of the work within the study area is also outlined within each assessment where applicable.

5.1 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA

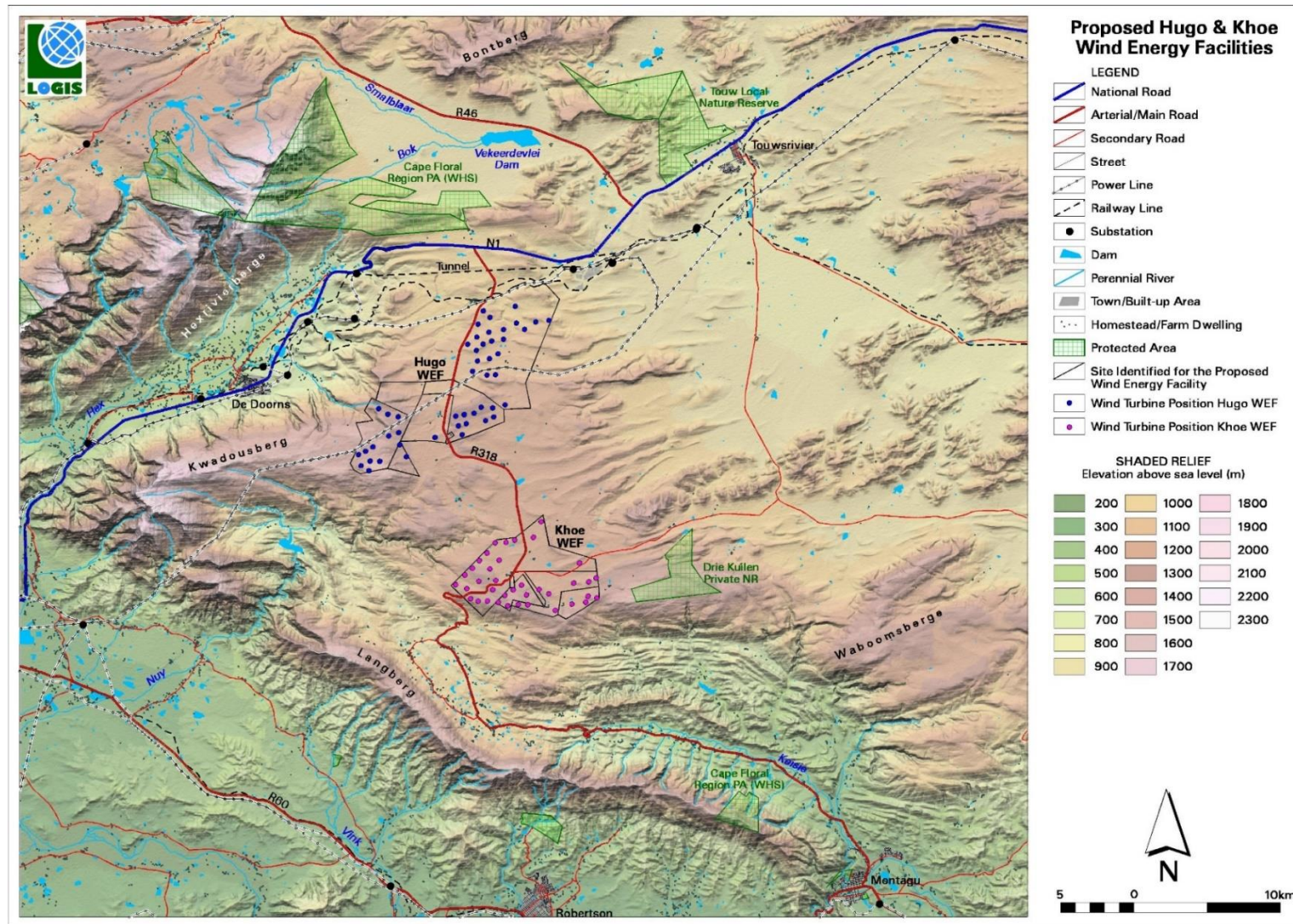
5.1.1 TOPOGRAPHY AND TERRAIN

The study area occurs on land that ranges in elevation from approximately 200 meters above sea level (masl) in the south west at the base of the Langeberg Mountain along drainage lines and in the west along the Hex River to 1800 masl on the tops of mountain ranges such as Kwadousberg and Langeberg (Figure 5-1). The site itself is located on land with an average elevation of 1500 masl. Numerous mountain ranges are located within the study area, namely the Hexrivierberge and Kwadousberg in the west, Langeberg to the south, Waboomsberge to the south east and Bontberg to the north. Prominent water sources within the study area include the Nuy, Vink, Keisie, Hex Rivers. The Smalblaar and Bok rivers flow into the Verkeerdevlei Dam in the north. See Figure 5-2 for the shaded relief/topography map of the study area.

FIGURE 5-1: UNDULATING TOPOGRAPHY OF THE SITE



FIGURE 5-2: SHADED RELIEF MAP OF THE STUDY AREA



The study area is located ~ 20km northwest of De Doorns, 20 km southwest of Touws River and 6km south of the N1, within the Langeberg Municipality. The site straddles the R 318, which is a designated tourist route in terms of the Langeberg SDF (2023). The R318 links Montagu to the south to the N1 to the north. The proposed Khoe WEF is located ~ 8-10 km south of the Hugo WEF, and also straddles the R318. An initial review of available information indicates that there are several provincial and private nature reserves and tourist facilities located in the area. The attraction to the area is linked to the natural landscape and rural character, including the areas vistas and views. The proposed Khoe WEF is therefore located in an area that is visually sensitive. Figure 5-4 illustrates the location of private and provincial nature reserves in the Langeberg Municipality and in vicinity to the proposed Khoe WEF site.

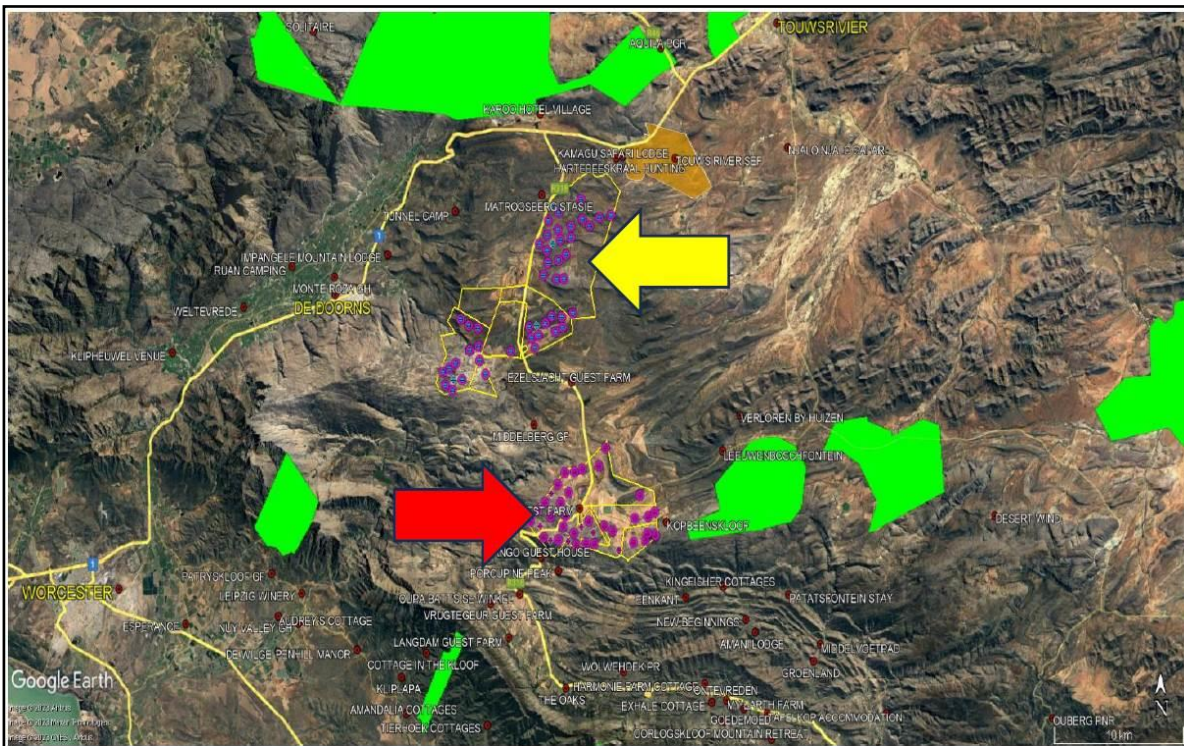


FIGURE 5-3: LOCATION OF HUGO WEF (YELLOW) IN RELATION TO KHOE WEF (RED) AND NATURE RESERVES

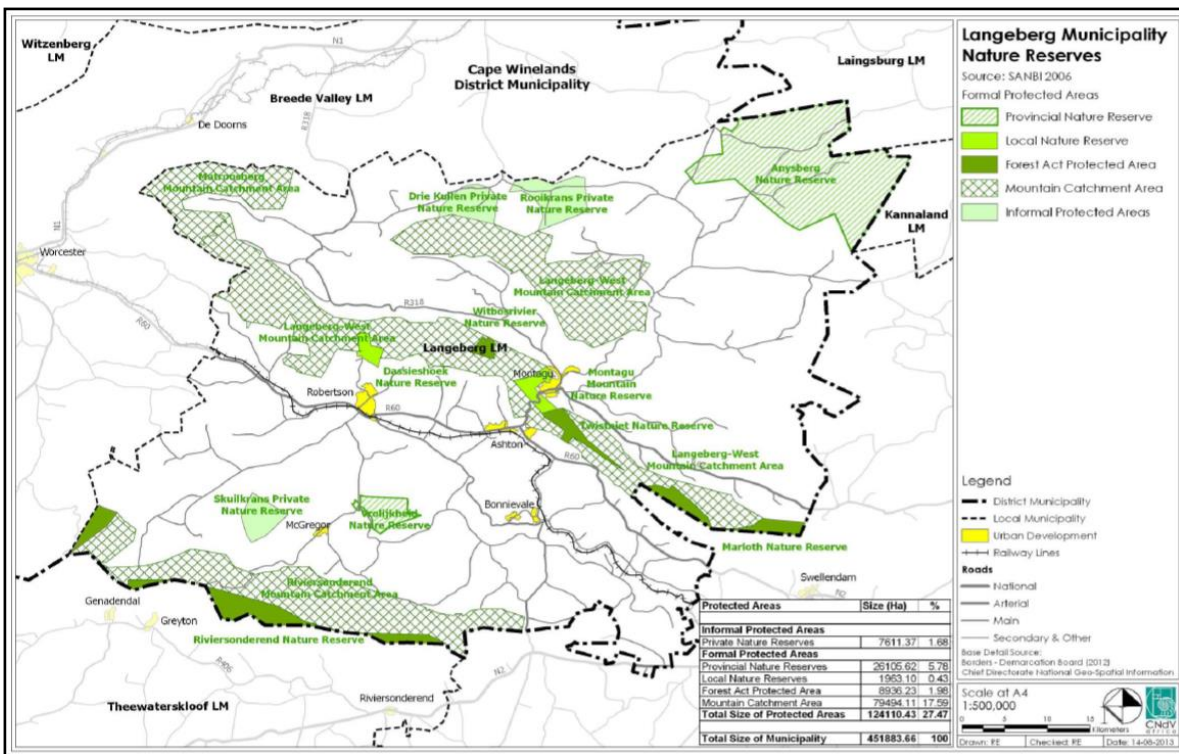


FIGURE 5-4: RESERVES AND PROTECTED AREAS

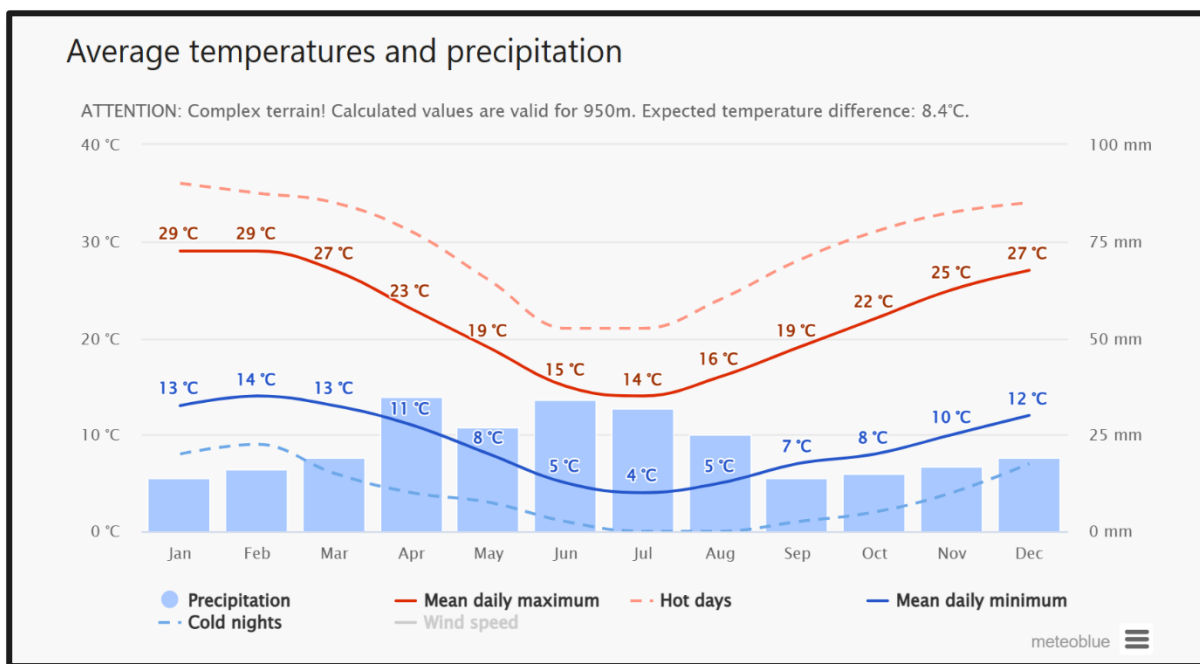
5.1.2 CLIMATE CONDITIONS

The proposed Khoe WEF is situated on a plateau, which is occasionally called the “Agterveld”. Most of the precipitation occurs in winter with a second winter rainfall that is often experienced from October to December. Seasonal snow occurs during winter.

Long-term climate data from the nearby Matroosberg weather station, is used for a general climate description for the Khoe WEF. Generally, January and September are the driest months, with an average of 14 mm of rainfall. April is the peak rainfall month with an average rainfall of 35 mm (see Figure 5-5 below). There is a difference of approximately 21 mm between the wettest and driest months (meteoblue.com, 2023).

The average maximum temperature is 29°C and the average minimum temperature 4°C, while the highest maximum recorded temperature is 36°C, and the lowest minimum is 0°C. The hottest months of the year are January and February, while the coldest month of the year is July (meteoblue.com, 2023). Rainfall averages 300 mm per annum, but varies with altitude from 150-470 mm. This area is denoted as a winter-rainfall area, with frost evident for 10 to 40 days per year.

FIGURE 5-5: CLIMATE OF THE MATROOSBERG WEATHER STATION (METEOBLUE.COM, 2023)



5.1.3 GELOGY, SOILS, LAND USE AND AGRICULTURAL POTENTIAL

The geology found at the site mainly consists of sandstone, shale, siltstone, and mudstone of the Bokkeveld Group. It also consists of quartzitic and feldspathic sandstone of the Skurweberg and Rietvlei Formations, and Table Mountain Group (DAFF, 2002).

The project site is located within a Protected Agricultural Area according to DALRRD (2020). The soils found at the Project area are predominantly very shallow to moderately deep, medium to heavy textured soils on underlying rock. The dominant soils are shallow on underlying weathered bedrock of the Glenrosa, Hutton, Swartland, and Mispah soil forms. There is a high proportion of rock outcrops. The site is in an area where there is little crop production. The soils are limited in their agricultural potential by shallow depths, rockiness, and low water holding capacity and are unsuitable for crop production as a result, except in some lower-lying areas where accumulation leads to deeper soils, and limited cropping is practiced. With reference to the soil capability classification, which is marked out of 9 (DAFF, 2017), the soils at the Khoe WEF site are predominantly 2 (low-very low), 4 (low-moderate) and 5 (moderate). The agricultural land use in the surrounding area, as well as the site is dry rain-fed crop land production, as well as grazing.

5.1.4 FRESHWATER AND WETLANDS (AQUATICS)

The site is situated within the North Langeberg Sandstone Fynbos, South Langeberg Sandstone Fynbos and Matjiesfontein Shale Renosterveld vegetation units, all forming part of the Die Brak river catchment. These vegetation units are not listed as a Threatened Ecosystem, by NEMA due to it being considered Endangered. A small southern portion of the site is located in the Koo River catchment however only one drainage feature associated with this catchment is located within the study area farm portions.

The study area is dominated by low lying drainage areas with riverine and drainage line systems, valley bottom wetland areas, seepage wetlands associated with several of the larger dams and

one small depression. Dams and weirs / berms with no wetland or aquatic features were also common within the study area.

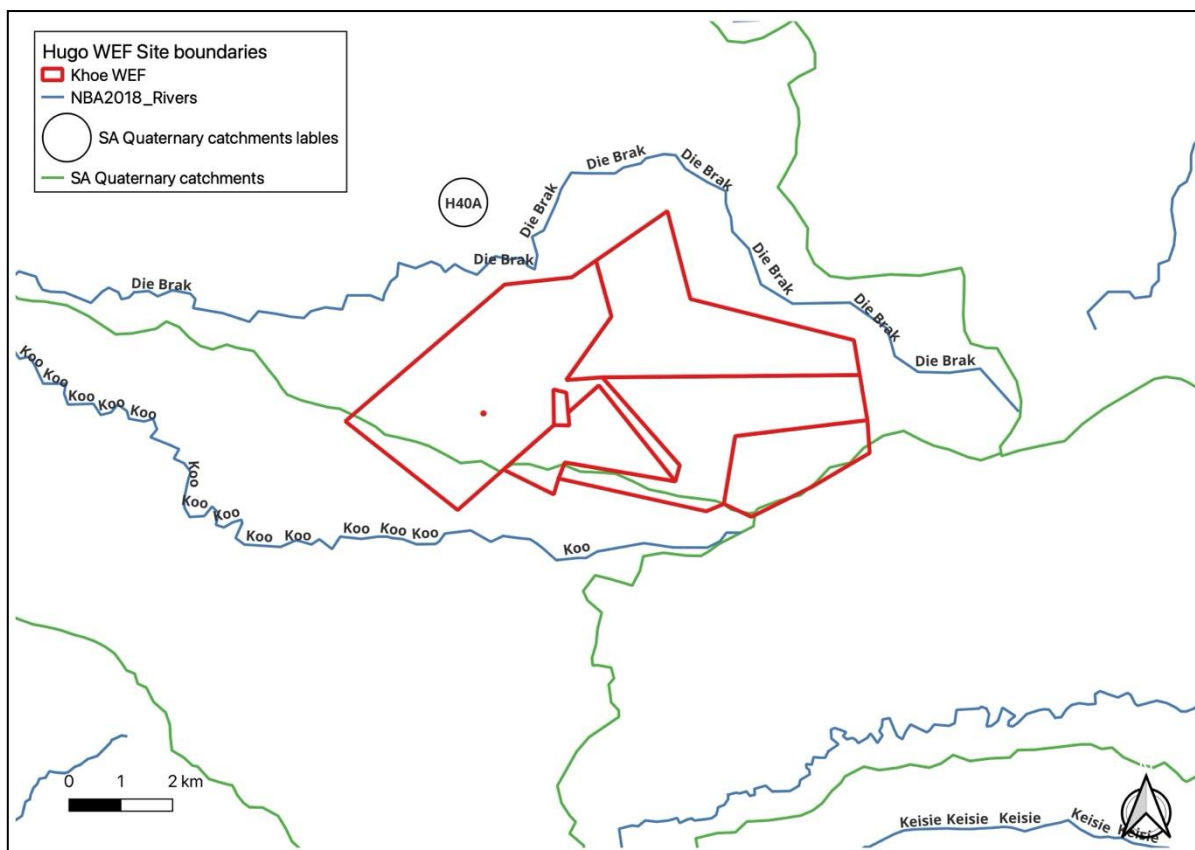
Further the area has seen a high degree of transformation in the form of cultivation areas, grazing, as well as the creation of several farm dams, roads and tracks. Of significance is the fact that most of the watercourses have either been converted into herring bone drain features or bermed to increase flows into downstream dams. This has then led to riverbed incision and the formation of the alluvial fans observed, i.e. sedimentation of low-lying downstream areas due to this and loss of vegetative cover.

The study area is located within the Southern Folded Mountain Bioregion, hence the diversity of high lying mountain catchments (mostly rocky) and the low-lying alluvial systems, but all located within the Breede-Olifants Catchment Management Agency and is the lead agent for water resources management within the Breede-Gouritz Water Management Area (BGWMA).

The Department of Forestry, Fisheries and Environment (DFFE) identified the aquatic environment for the study area as having a Very High Sensitivity, to the presence of:

- Critical Biodiversity Areas (CBA) 1: Aquatic
- Ecological Support areas (ESA) 1: Aquatic
-

FIGURE 5-6: QUATERNARY CATCHMENTS AND MAINSTREAM RIVERS AROUND PROJECT SITE (SOURCE: DWS AND NGI)



Groundtruthed delineations were compared to current waterbody inventories (Figure 5-7) (van Deventer *et al.*, 2020), 1: 50 000 topocadastral surveys mapping and the site. These inventories include wetland spatial data based on landcover 2007 data, previous assessments and wetland information retained by the Provincial authorities, combined into one database that formed part

of the updated National Spatial Biodiversity Assessment, 2018. However, little was known or assessed previously for this site.

A baseline map was then developed and refined using the 2023 survey data, noting that due to the topography and geology, the features were digitised at a scale of 1:5 000 (Figure 5-8).

Coupled to the aquatic delineations, information was collected on potential species that could occur within the watercourses, especially any conservation worthy species (Listed or Protected, however none were observed (aquatic), that will be impacted upon within the proposed footprint.

None of the dominant riparian / wetland associated plant species observed are listed or protected under any form of legislation. Plant species included the following:

- *Ficinia nodosa*
- *Juncus effusus*
- *Carex spp*
- *Centella asiatica*
- *Erianthus capensis*
- *Sporobolus fimbriatus*
- *Cynodon incompletus*
- *Erharta calcynia*
- *Merxmuellera disticha*
- *Phragmites australis*
- *Cynodon dactylon*

This was confirmed by accessing data housed by the Freshwater Biodiversity Information System (FBIS), where sites (1) on the Die Brak River, an ephemeral system, contained approximately 6 floral species, previously observed, however all are listed as Least Concern. These included:

- *Arctotis arctotooides* (L.fil.) O.Hoffm.
- *Brachylaena neriifolia* (L.) R.Br.
- *Brunia africana* (Burm.fil.) Class.-Bockh. & E.G.H.Oliv.
- *Brunia noduliflora* Goldblatt & J.C.Manning
- *Marsilea macrocarpa* C.Presl
- *Spiloxene capensis* (L.) Garside

Similarly, amphibian species are known to occur within the region based on collection data for the region, but little is known of the actual distribution of frogs within the study area. Therefore, based on mapping data contained in Minter *et al.* (2004) and the FrogMAP spatial database, indicates the potential frogs known to occur in the area and their preferred habitat, with one frog species being observed during this assessment.

FIGURE 5-7: NATIONAL WETLAND INVENTORY - WETLANDS AND WATERBODIES (VAN DEVENTER ET AL., 2020)

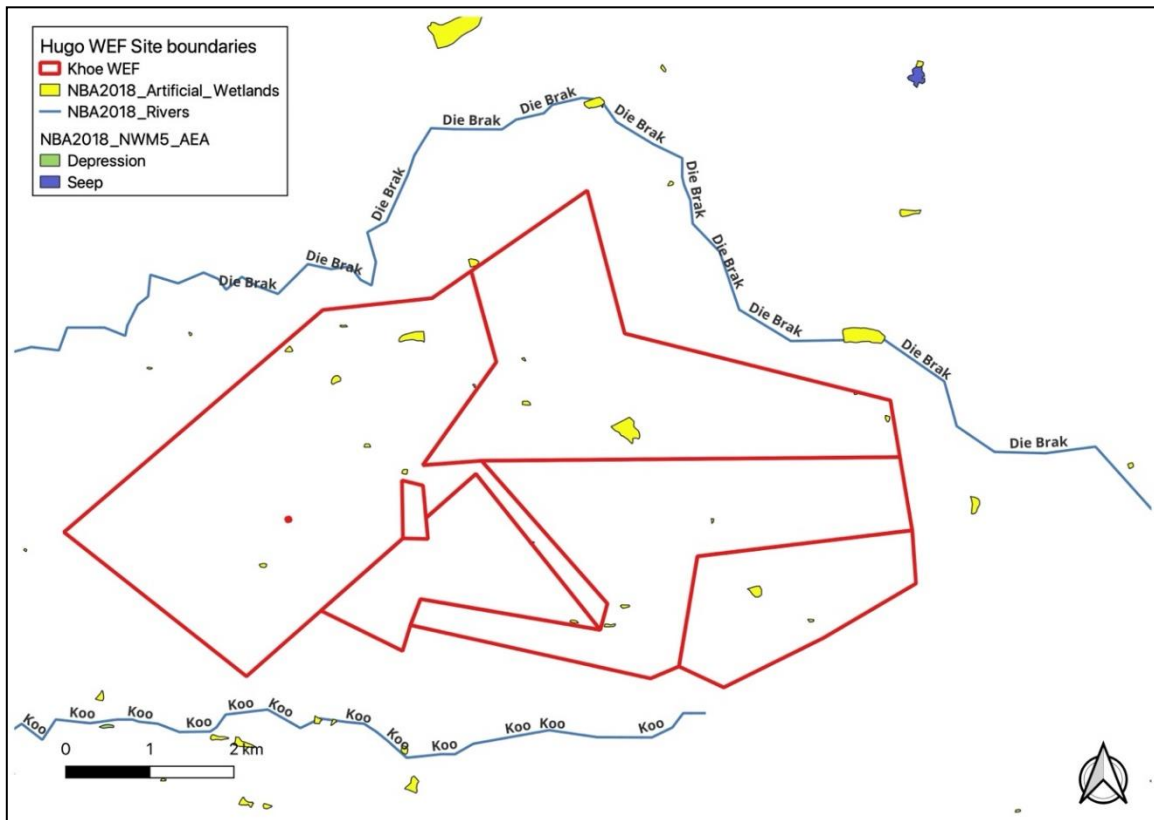
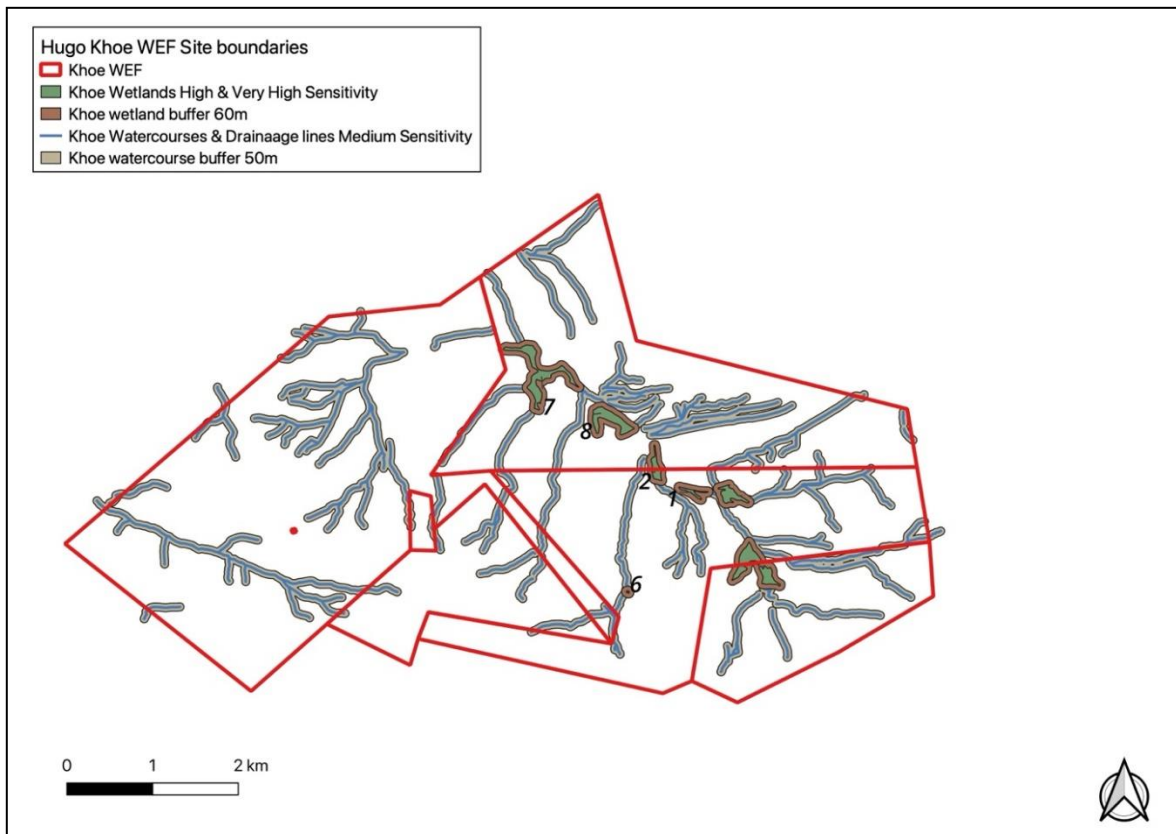


FIGURE 5-8: WATERBODIES DELINEATED IN THIS ASSESSMENT BASED ON GROUNDTRUTHING INFORMATION COLLECTED



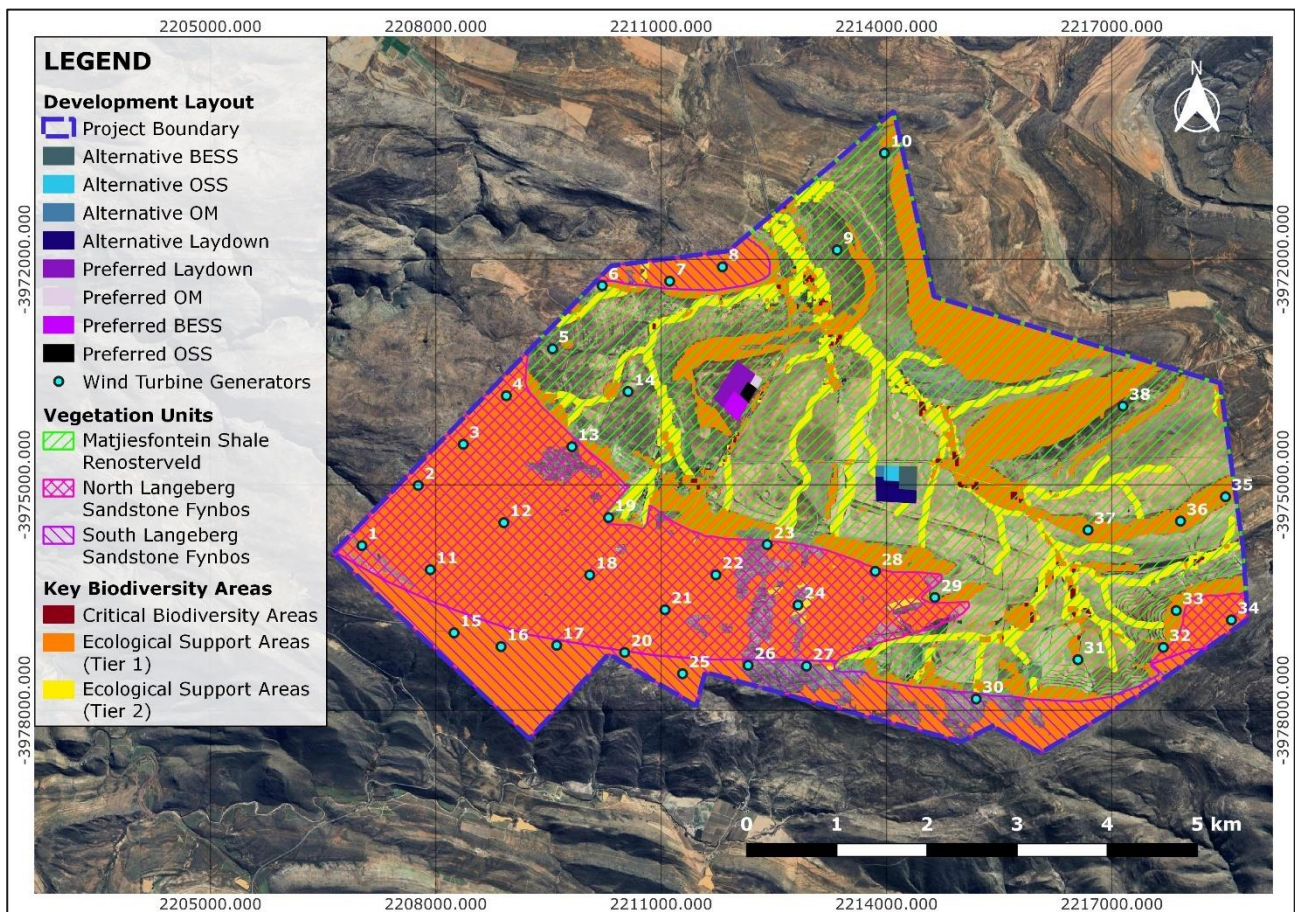
5.1.5 TERRESTRIAL BIODIVERSITY

5.1.5.1 FLORA

The proposed Khoe WEF PAOI is dominated by Matjiesfontein Shale Renosterveld (FRs 6), followed by a section of North Langeberg Sandstone Fynbos (FFs 15) and a smaller section of South Langeberg Sandstone Fynbos (FFs 16) in the southern sections of the project Project Area of Influence (Figure 5-9). All three of the vegetation types identified are listed as Least Concern by the RLE (2021).

The landscape of the Matjiesfontein Shale Renosterveld (FRs 6) is described as being elevated areas (low mountains, parallel hills and mid-altitude plateaus) of low, moderate density leptophyllous shrubland dominated by renosterbos (*Elytropappus rhinocerotis*). Heuweltjies, which are soil mounds associated with increased local biodiversity, have been recorded in low densities in some places²⁷. The North- (FFs 15) and South Langeberg Sandstone Fynbos (FFs 16) are similar in their constituent vegetation types of proteoid-, restioid- and ericaceous fynbos, differing only by occurrence altitude and (FFs 15) also including asteraceous fynbos on lower slopes.

FIGURE 5-9: IMPORTANT PLANT SPECIES AREAS WITHIN THE PROPOSED KHOE WIND ENERGY FACILITY STUDY AREA

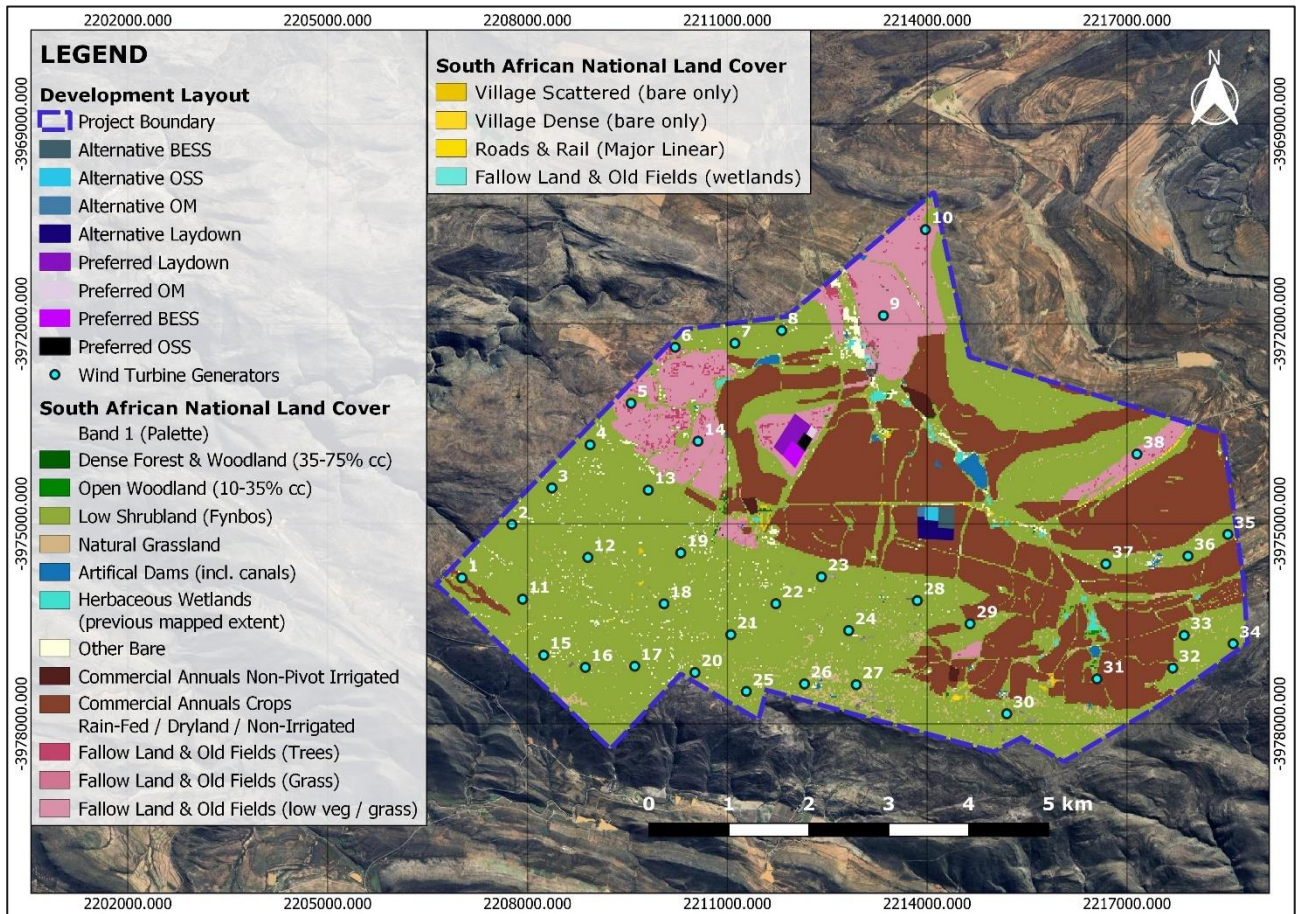


The majority of the site falls within ESA1 which is classified as such due to the presence of both aquatic- and terrestrial features that contribute to broader ecological balance and processes that are essential in supporting biodiversity conservation. Areas identified as ESA2 are watercourses

²⁷Mucina, L. & Rutherford, M.C. (2006). The vegetation of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute.

marked for rehabilitation from former land-use. Small areas identified as CBAs are due to the presence of aquatic features that maintain important ecological balance and processes that are essential in supporting biodiversity conservation. None of the Wind Turbine Generators (WTG) occur in the CBA, and are mostly distributed in ESA1 and ESA2, with some in areas not marked as important plant areas. According to the SANLC (2020) spatial dataset the proposed Khoe WEF Project Area of Influence (Figure 5-10) is dominated by low fynbos shrublands, commercial annual crops (rain-fed, dryland or non-irrigated) and fallow lands and old fields (low vegetation and grassland).

FIGURE 5-10: THE LATEST AVAILABLE SOUTH AFRICAN NATIONAL LAND COVER DATASET OF THE PROPOSED KHOE WIND ENERGY FACILITY.



Additional land use types present include dense forest and woodland (35 – 75% closed canopy/CC), open woodland (10 – 35% CC), natural grassland, artificial dams, herbaceous wetlands (previous mapped extent), other bare areas, commercial annuals (non-pivot irrigated), commercial annual crops (rain-fed, dryland and non-irrigated), fallow lands and old fields (trees, grass, low vegetation and wetlands), village scattered, village dense and, roads and rail (major linear).

5.1.5.2 FAUNA

The main vegetation types across the proposed development area are Matjiesfontein Shale Renosterveld, with North Langeberg Sandstone Fynbos on the mountain slopes. Ploughed fields dominate the low-lying areas, with small grain grazing and a relatively high density of sheep farming (c. 53 density per km²). The proposed development area lies near the southwestern edge of the currently understood range for Riverine Rabbit.

FIGURE 5-11: ECOLOGICAL STATE OF THE PROPOSED PROJECT AREA

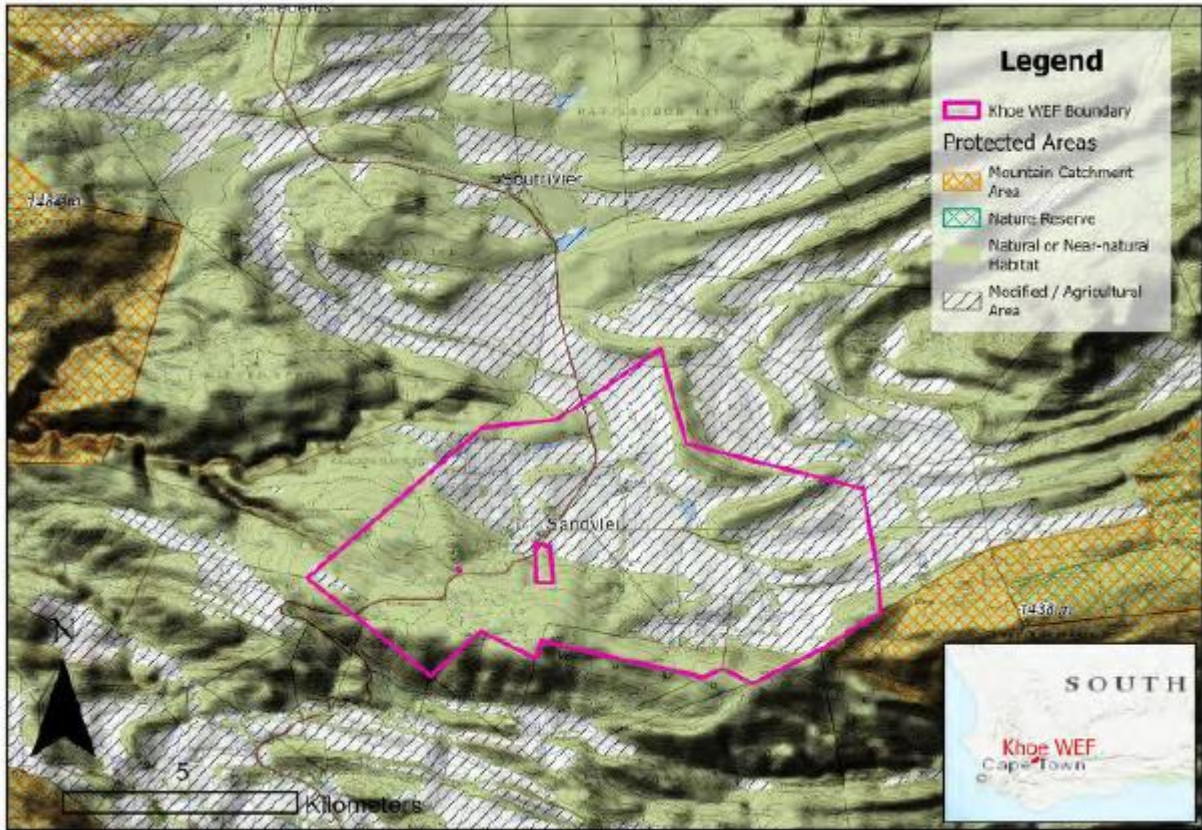
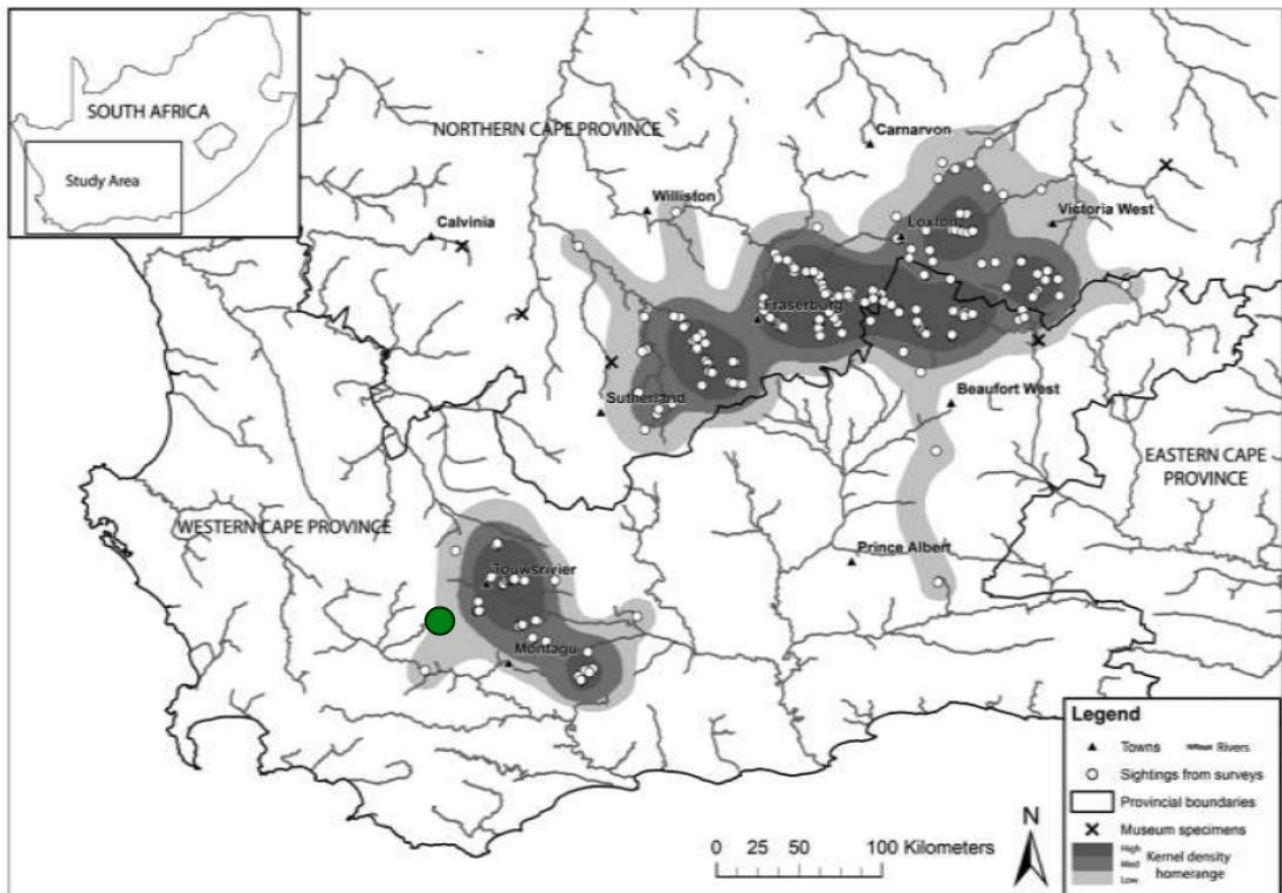


FIGURE 5-12: POSITION OF THE PROPOSED DEVELOPMENT SITE (GREEN) RELATIVE TO KERNEL DENSITY POLYGONS AROUND RIVERINE RABBIT RECORDS (REPRODUCED FROM COLLINS AND DU TOIT (2016)²⁸



Source: Collins, K. and du Toit, J.T. (2016)

Of the nine (9) animal species of conservation concern with ranges that potentially overlap with the proposed development area, the presence of Bontebok (*Damaliscus pygargus pygargus*), African Buffalo (*Syncerus caffer*), African Elephant (*Loxodonta africana*), Lion (*Panthera leo*) and Hippopotamus (*Hippopotamus amphibius*) have been excluded as part of the SEI evaluation and will be omitted from the impact assessment process. These records are associated with individuals re-introduced to managed game reserves but are not considered to be fully functioning as part of the Project Area of Influence ecosystem. The subspecies of Tent Tortoise (*Psammobates tentorius*) relevant to the proposed development area is the Karoo Tent Tortoise (*P. t. tentorius*), listed as Least Concern therefore not considered to be a SCC. The rare Caledonian Copper Butterfly (*Aloeides caledoni*) was considered unlikely to occur across the proposed project area and highly unlikely to experience significant negative impact from the proposed development and was therefore also excluded from further consideration. The primary animal SCCs relevant to the proposed development were therefore the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*), Vulnerable Leopard (*Panthera pardus*) and Near Threatened Grey Rhebok (*Pelea capreolus*).

²⁸ Collins, K. and du Toit, J.T. (2016), Population status and distribution modelling of the critically endangered riverine rabbit (*Bunolagus monticularis*). *Afr. J. Ecol.*, 54: 195-206. <https://doi.org/10.1111/aje.12285>

Riverine Rabbit

Riverine Rabbits are considered to have a critically low population size, with estimates for a total population size of 157 – 207 mature individuals²⁹.

FIGURE 5-13: RIVERINE RABBIT RECORDED ON SITE AT CAMERA TRAP STATION HTC01 SHOWING CHARACTERISTIC DARK CHIN-STRAP



There are an estimated 12 subpopulations, three in the southern population and nine in the northern population. Subpopulations are isolated from each other by jackal-proof fencing and severe land transformation through agricultural practices. The distribution and population size for this species is not well understood. A recent study suggested³⁰ that riverine rabbits may be restricted to the more fertile plains, whilst being unable to compete with the ecologically flexible hares (*Lepus* spp.) which can use refugia present along a range of ruggedness. The study did not detect Riverine Rabbit and hare together at any site and inferred spatial segregation through interspecific competition as a strong driver of species distribution.

Leopard

The southern African leopard population is comprised of several geographically isolated groups, with slight genetic differences caused by distance isolation. These differences are not considered enough to classify each group as a separate subspecies. The Cape Leopard in the proposed

²⁹ Collins, K., Bragg, C. & Birss, C. 2019. *Bunolagus monticularis*. The IUCN Red List of Threatened Species 2019: e.T3326A45176532

³⁰ Woodgate, Z. & Distiller, G. & O’Riain, M.J. 2021. Hare today, gone tomorrow: the role of interspecific competition in shaping riverine rabbit occurrence. *Endangered Species Research*. 44. 10.3354/esr01106

development area (*Panthera pardus pardus*) is therefore classified as the same species as the savanna/bushveld leopard. Nevertheless, Cape leopards are about half the mass of Savanna Leopard. On average males weigh in at around 35 kg (cf. 60 – 70 kg for Savanna Leopard), whereas females weigh around 20 kg (cf. 35 – 40 kg). Another key difference is that home range sizes of Cape Leopard are far larger than those of Savanna Leopard. While male leopards in the Kruger National Park have a home range of 25 to 50 km², the range of a male Cape leopard is between 200 and 1 000 km². There is no definitive total for leopard numbers in the Western Cape, however data from recent studies in three distinct mountain areas suggest the number to be fewer than 1 000s individuals. Effective conservation of leopards depends largely on the protective measures that can be implemented outside existing conservation areas. Habitat loss and fragmentation, roads and traffic and too frequent and large-scale veld fires are considered amongst the main conservation threats to Cape Leopard.

Grey Rhebok

Grey Rhebok, listed as Near Threatened and endemic to South Africa, Lesotho and parts of Eswatini, were recorded across the proposed development area. Local declines in their population have been attributed to increased densities of natural predators, such as Black-backed Jackal, Caracal and Leopard. This species has been confirmed present across the proposed development area, however, Grey Rhebok are a relatively mobile species and are not strictly dependent on any particular habitat. Suitable habitat is therefore widely available in the immediate vicinity of the proposed development and individuals will unlikely be permanently displaced if movement across the area is not prevented.

5.1.5.3 AVIFAUNA

The study area is predominantly *Matjiesfontein Shale Renosterveld* in the Fynbos biome (Mucina and Rutherford, 2006). It is designated as Least Concern. It is dominated by ploughed farmland and several large farm dams with Renosterveld fragments in between at mid-altitudes (~1,200 masl). Few ericas and proteas were present as most natural vegetation had been ploughed. Other vegetation types found in this area includes South Langeberg Sandstone Fynbos and North Langeberg Sandstone Fynbos

FIGURE 5-14: ILLUSTRATION OF THE KHOE WEF SITE WHICH IS PREDOMINATLY USED FOR SHEEP GRAZING



Bird habitat in the region consists of *Matjiesfontein Shale Renosterveld*, but dominated by agriculturally modified areas that fragment the natural vegetation. Low rocky ridges provide perch sites and topographic highs for soaring birds. The agricultural fields are rarely punctuated by small trees that grow around water points. Few grasses are found, with the main land use being sheep farming. Some of the large farm dams provide ideal habitat for Blue Cranes that are common throughout the area.

Power lines run outside of the proposed Khoe WEF site, to the north (traversing the Hugo site), while small stands of mature poplars occur in water courses outside the study areas. Both artificial habitats provide unexpected nesting habitat for large eagles while, surrounding cliffs, also off site, provide suitable breeding cliffs for Verreaux's Eagles. Verreaux's Eagles were commonly recorded over the Khoe WEF site and were the most frequently recorded raptor with a Passage Rate of 0.11 flights/hour (about one flight per day).

FIGURE 5-15: AN ILLUSTRATION OF VERREAUX'S EAGLES WHICH WERE COMMONLY RECORDED ON SITE



5.2 NOISE

The soundscape on site was dominated by bird and insect communication, with some sounds from domestic animals (dogs, cows, sheep and chickens) audible at times. Wind speeds were generally low during the September 2023 measurements, with ambient sound levels measured during periods with higher wind speeds during the December 2022 period (though generally less than 7 m/s).

Considering the average fast-weighted sound level data collected in the area:

- Daytime fast-weighted sound levels ranged from less than 20 to more than 70 dBA, with average daytime sound levels being 43.1 dBA. This is typical of a rural noise district and considering the developmental character, a rating level of 45 dBA (typical of a rural noise district) will be assumed for the daytime period.
- Night-time fast-weighted sound levels ranged from less than 20 to more than 70 dBA, with average night-time sound levels being 32.2 dBA. This is typical of a rural noise district, with a typical rating level of 35 dBA.

5.3 BATS

Bat activity is expected to be higher during months that display relatively higher temperatures, with lower wind speeds. Bats are dependent on suitable roosting sites provided, amongst others, by vegetation, exfoliating rock, rocky outcrops, derelict mines and aardvark holes, caves, and human structures (Monadjem, et al., 2020). The foraging utility of a site is further determined by water availability and the availability of food. Thus, the vegetation, geomorphology, and geology of an area are important predictors of bat species diversity and activity levels.

5.3.1 VEGETATION

The site is covered in typical Matjiesfontein Shale Renosterveld, South Langeberg Sandstone Fynbos and North Langeberg Sandstone Fynbos, see Figure 5-16. Although the natural vegetation does not support trees, there are limited trees situated in the non-perennial riverbeds and near houses, which could provide roosting opportunities for bats that prefer roosting in vegetation or under the bark of trees.

FIGURE 5-16: TYPICAL VEGETATION AT THE KHOE WEF SITE



5.3.2 ROCK FORMATIONS, ROCK FACES AND ANIMAL BURROWS

Rock formations along the hilltops, and the river valleys provide ample roosting opportunities for bats. Bats can also make use of abandoned burrows as roosts. Examples of rock formations on site are shown in Figure 5-17. Numerous mountainous areas surrounding the proposed site could support bat roosts, and bats from these neighbouring roosts, could traverse the site of the proposed WEF to forage, drink or migrate.

FIGURE 5-17: ROCK FORMATIONS WHICH COULD PROVIDE POSSIBLE ROOSTING OPPORTUNITIES FOR BATS



5.3.3 HUMAN DWELLINGS AND BUILDING STRUCTURES

Where roofs are not sealed off, human dwellings could provide roosting space for some bat species. Up to now, no evidence of bat roosts has been found at the farm dwellings, but this is an ongoing study. There are still farm dwellings to investigate and further roost investigations will be conducted during late spring and summer.

5.3.4 OPEN WATER AND FOOD SOURCES

During the rainy season, stagnant water that usually collects in small pans and dry ditches could serve as breeding grounds for insects, which could serve as food for bats. High insect activity results in higher bat presence after sporadic rainy periods. Open dams provide permanent, open water sources for bats throughout the year (Figure 5-18).

FIGURE 5-18: PERMANENT, OPEN WATER SOURCE AT SANDVLEI



5.3.5 BACKGROUND TO BATS IN THE AREA

The extent to which bats may be affected by the proposed WEF will depend on the extent to which the proposed development area is used as a foraging site or as a flight path by local bats.

A summary of bat species distribution, their feeding behaviour, preferred roosting habitat, and conservation status is presented in Table 5-1. The bats identified in Table 5-1 have distribution ranges that include the Khoe WEF development site and bat presence that was confirmed on the site itself, or other wind farms in the area, are marked as such. The proposed WEF is located within the distribution range of six families and approximately 12 species. Table 5-1 is informed by the most recent distribution maps of Monadjem, *et al.* (2010 and 2020). The information in

Table 5-1 will be updated as required during the EIA phase, based on the outcomes of the monitoring programme.

Of the 12 species with distribution ranges that include the proposed development area, four have a conservation status of Near Threatened in South Africa and one Vulnerable, while three have a global conservation status of Near Threatened. *Eptesicus hottentotus* (the Long-tailed serotine), *Cistugo seabrae* (the Angolan wing-gland bat) and *Rhinolophus capensis* (Cape horseshoe bat) are endemic to Southern Africa and have limited suitable habitat left, mainly due to agricultural activities (Monadjem, *et al.*, 2010).

According to the likelihood of fatality risk, as indicated by the latest pre-construction guidelines (MacEwan, 2020) six species, namely *Miniopterus natalensis* (Natal long-fingered bat), *T. aegyptiaca* (Egyptian free-tailed), *S. petrophilus* (Roberts's flat-headed bat), *L. capensis* (Cape serotine) and the two Pteropodidae species (fruit bats) have a high risk of fatality, while *Myotis tricolor* (Temminck's myotis bat) has a medium-high risk and the endemic *E. hottentotus* has a medium risk of fatality.

The two Pteropodidae species (fruit bats) are not expected to roost on the project site itself, as this environment is not expected to be their preferred habitat; however, the proximity of the mountains around the site, the agricultural activities of the Hexrivier valley situated in the north-westerly direction, and the presence of water sources in the area, might attract fruit bats if they migrate over the area and the possibility that they could sporadically occur at the development area should not be ruled out.

Rhinolophus clivoses was recorded in the surrounding area, but not on the Khoer terrain yet. There is a high likelihood that some of the Rhilophus species might occur in the more densely vegetated valleys. As indicated by Table 5-1 these bats are clutter foragers and have a low likelihood of fatality risk.

TABLE 5-1: POTENTIAL BAT SPECIES OCCURRENCE AT THE PROPOSED KHOE WEF SITE. INFORMATION ABOUT THE SPECIES IS FROM MONADJEM, ET AL. (2010 AND 2020)

Family	Species	Common Name	SA conservati on status	Global conservati on status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed at Khoe and surroundin gs	Bats recorded on the Khoe project site
PTEROPODI DAE	Eidolon helvum	African straw-coloured fruit	Not evaluated	Least Concern	Little known about roosting behaviour	Broad wings adapted for clutter. Studies outside of South Africa list fruit and flowers in its diet.	Migrater. Recorded migration up to 2 518 km in 149 days, and 370 km in one night.	High		
	Rousettus aegyptiacus	Egyptian rousette	Least Concern	Least Concern	Caves	Broad wings adapted for clutter. Fruit, known for eating Ficus species.	Seasonal migration up to 500 km recorded. Daily migration of 24 km recorded.	High		
MINIOPTER IDAE	Miniopterus natalensis	Natal long-fingered bat	Near Threatened	Near Threatened	Caves	Clutter-edge, insectivorou s	Seasonal, up to 150 km	High	✓	✓

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed at Khoe and surroundings	Bats recorded on the Khoe project site
NYCTERIDAE	Nycteris thebaica	Egyptian flit-faced bat	Least Concern	Least Concern	Cave, Aardvark burrows, road culverts, hollow trees. Known to make use of night roosts.	Clutter, insectivorous, avoid open grassland, but might be found in drainage lines	Not known	Low		
MOLISSIDAE	Tadarida aegyptiaca	Egyptian free-tailed bat	Least Concern	Least Concern	Roofs of houses, caves, rock crevices, under exfoliating rocks, hollow trees	Open-air, insectivorous	Not known	High	✓	✓
	Sauromys petrophilus	Robert's Flat-faced	Least Concern	Least Concern	Narrow cracks, under exfoliating of rocks, crevices.	Open-air, insectivorous		High	✓	✓
RHINOLOPHIDAE	Rhinolophus capensis	Cape horseshoe bat (endemic)	Near Threatened	Near Threatened	Caves, old mines. Night roosts used	Clutter, insectivorous	Not known	Low		
	Rhinolophus clivosus	Geoffroy's horseshoe bat	Near Threatened	Least Concern	Caves, old mines.	Clutter, insectivorous		Low	✓	

Family	Species	Common Name	SA conservati on status	Global conservati on status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed at Khoe and surroundings	Bats recorded on the Khoe project site
					Night roosts used					
VESPERTILI ONIDAE	Laephotis capensis (Neoromicia capensis)	Cape roof bat (Cape serotine)	Least Concern	Least Concern	Roofs of houses, under bark of trees, at basis of aloes	Clutter-edge, insectivorou s	Not known	High	✓	✓
	Myotis tricolor	Temminck's myotis	Near Threatened	Least Concern	Roosts in caves, but also in crevices in rock faces, culverts, and manmade hollows	Limited information available	Not known	Medium-High		
	Eptesicus hottentotus	Long-tailed serotine (endemic)	Least Concern	Least Concern	Caves, rock crevices, rocky outcrops	Clutter-edge, insectivorou s	Not known	Medium	✓	✓
	Cistugo seabrae	Angolan wing-gland bat (endemic)	Vulnerable	Near Threatened	Possibly buildings, but no further information	Clutter-edge, insectivorou s	Not known	Low		

*Likelihood of fatality risk as indicated by the Pre-Construction Guidelines (MacEwan, et al., 2020b).

**Neoromicia capensis has been reclassified as Laephotis capensis (Cape roof bat)

5.4 SOCIO-ECONOMIC

The study area is located within the Langeberg Local Municipality, which forms part of the Cape Winelands District Municipality. The Cape Winelands District Municipality (WDM) is a category C municipality that is made up of five local municipalities namely, Breede Valley, Drakenstein, Langeberg, Stellenbosch and Witzenberg municipalities. The town of Montagu is the administrative seat of the LM.

5.4.1 POPULATION

The 2020 Socio-Economic Profile (SEP) for the Langeberg Municipality (LM) prepared by the Western Cape Department of Social Development, indicates that the population of the LM in 2020 was 118,434 making it the second most populated municipality in the Winelands district Municipality. The population is projected to be 126,640 by 2024 which equates to a 1.7% annual average growth rate. Based on the 2022 Census data the population of the LM was 94,045, which is lower than the SEP figure and raises concerns about the accuracy of the 2022 Census data. The total number of households was 25,370, with an average household size of 3.7, slightly lower than the 3.9 figure for 2011.

Based on the SEP, young children under the age of 15 made up 29% of the population, the working age cohort (15-64) made up 65% and people 65 years and older made up 6%. Based on these figures the dependency ratio was 54%. Based in the data from Census 2022, children under the age of 15 made up 22.6%, the working age cohort (15-64) made up 69.7% and people 65 years and older made up 7.6%. Based on these figures the dependency ratio was 43.4%. The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The difference between the 2020 SEP and 2022 Census data is therefore a concern.

The available 2022 Census data does not provide information on race groups or language. Based on the 2016 Community Household Survey Coloureds made up 75%, followed by Black Africans (17%) and Whites (12%). The main first language spoken was Afrikaans (80%), followed IsiXhosa (13%) by English (3%) (Community Household Survey 2016).

5.4.2 HOUSEHOLD TYPES

There were a total number of 236,480 (2020) and 30,690 (2020) households in the Cape Winelands District and Langeberg Local Municipality respectively. Of these, 91.3% (Langeberg Local Municipality) and 82.4% (Cape Winelands District) were formal main dwellings. Approximately 2.3% of the structures in the Langeberg Local Municipality and 10.8% in Cape Winelands District were shacks. Most dwellings in the Langeberg Local Municipality and Cape Winelands District are therefore formal structures. In 2016, 46% of the properties in the Langeberg Local Municipality were owned and fully paid off, while 9% of properties were occupied rent free. In the Cape Winelands District, 2016 figures indicated that 17% of properties were occupied rent free (Community Survey, 2016). In 2016, it was reported that approximately 31.6% of the households in the Langeberg Local Municipality and 34.19% of the households in Cape Winelands District were headed by women (Community Survey, 2016). These figures are lower than the Western Cape provincial rate of 38.04% (Community Survey, 2016). Despite the

figures for the Langeberg Local Municipality being lower than the district and provincial percentages, women headed households tend to be more vulnerable.

5.4.3 HOUSEHOLD INCOME

At the time of preparing the report no data on household income was available from the 2022 Census. The data is therefore still based on 2011 Census. Based on this data, 10% of the population of the LM had no formal income, 2% earned less than R 4,800, 4% earned between R 5,000 and R 10,000 per annum, 16% between R 10,000 and R 20,000 per annum and 25% between R 20,000 and R 40,000 per annum (2011).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3,200 per month for an average sized household (~ R 40,000 per annum). Based on this measure, in the region of 57% of the households in the LM live close to or below the poverty line. The figures for the Cape Winelands District Municipality and Western Cape were 53.7% and 50.1% respectively. The low-income levels reflect the limited employment opportunities and dependence on the agricultural sector. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the LM. This in turn impacts on the ability of the LM to maintain and provide services.

Employment

The 2020 SEP for the LM Municipality notes that the unemployment rate in the LM has been between 4.1 and 7.2% over the last 10 years and was 7.2% in 2019 (Source: SEP LM 2020). The figures are lower than WDM and provincial figures over the same period. The figure for the Western Cape in 2020 was 18.9%.

FIGURE 5-19: UNEMPLOYMENT RATES FOR LANGEBERG MUNICIPALITY

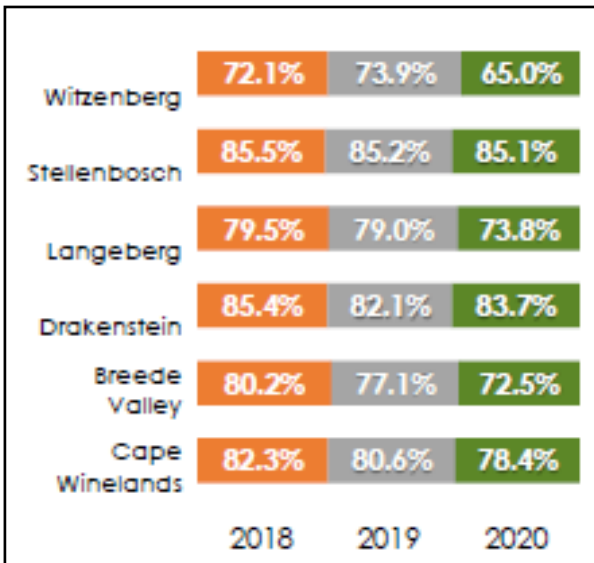
Unemployment rates	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Drakenstein	11.2	12.6	12.9	12.6	12.2	12.6	11.6	12.6	13.2	13.1	14.2
Langeberg	5.1	6.1	6.3	6.2	5.9	6.2	5.4	6.1	6.4	6.5	7.2
Stellenbosch	8.2	9.4	9.7	9.6	9.3	9.6	8.9	9.9	10.3	10.3	11.3
Witzenberg	5.8	6.8	6.9	6.6	6.1	6.4	5.4	5.9	6.2	6.2	6.7
Breede Valley	8.6	9.9	10.1	9.8	9.4	9.7	8.6	9.5	9.9	9.9	10.7
Cape Winelands	8.4	9.7	9.9	9.7	9.2	9.6	8.6	9.5	9.9	9.9	10.7
Western Cape	14.2	15.5	15.7	15.8	15.7	16.0	16.1	17.3	18.1	18.0	19.4

Source: SEP LM 2020

5.4.4 EDUCATION

Based on the information contained in the SEP, the matric pass rate in the LM was 73.8% in 2020, down from 79% in 2019 and 79.5% in 2018. After the Witzenberg and Breede Valley Municipality, the LM had the lowest matric pass rate in the WDM in 2020 (Figure 5-20)

FIGURE 5-20: MATRIC PASS RATES FOR LOCAL MUNICIPALITY AND CAPE WINELANDS DISTRICT MUNICIPALITY



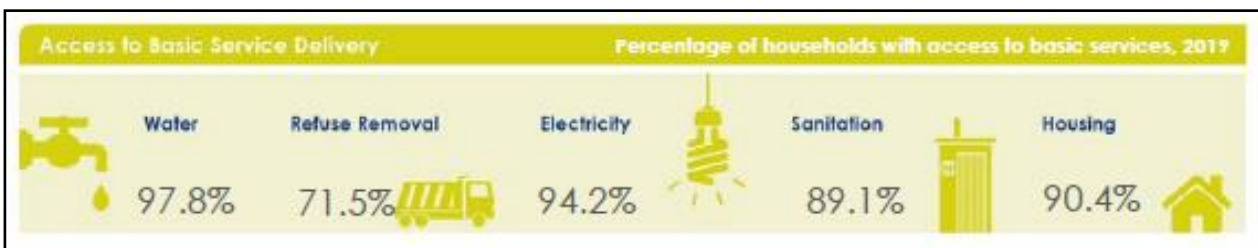
Source: SEP LM 2020

5.4.5 MUNICIPAL SERVICES

Based on the information from the 2020 SEP, 94.2% of households in the LM had access to electricity, 97.8% had access to water, 89.1% had access to sanitation services, and 71.5% had their refuse removed on a regular basis (Figure 5-21). In summary, service levels in the LM can be described as good.

The figures from the 2022 Census indicate that 96.8% have access to electricity, 91.7% access to piped water, 96.3% are connected to sewage, and 85.7% have access to weekly refuse collection services. Some of the figures are similar to the SEP figures, while others are higher and or lower.

FIGURE 5-21: SUMMARY OF MUNICIPAL SERVICES



Source: SEP LM 2020

5.4.6 HEALTH AND EDUCATION FACILITIES

5.4.6.1 EDUCATION FACILITIES

Based on the 2021 SEP, there are 52 schools in the LM, of which 45 (88%) are no-fee schools. This reflects the low-income levels in the area. Less than 50% of the schools, (48%) are equipped with libraries.

5.4.6.2 HEALTH CARE FACILITIES

Access to healthcare services is a basic human right and one that is directly affected by the number and spread of facilities within their geographical area. In terms of healthcare facilities, there are 2 district hospitals in the LM, 7 health care facilities (fixed clinics, Community Health Care Centers, and Community Day Centers, 6 PHC Clinics (Satellite and Mobile) and 7 fixed PHC Clinics.

Child health is a key indicator of well-being and potential needs. The United Nations Sustainable Development Goals (SDGs) aim to end preventable deaths of new-borns and children under 5 years of age by 2030, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortalities to at least as low as 25 per 1,000 live births (Source: UN SDG's). Key criteria used to measure child health include immunisation rates³¹, percentage of malnourished children³², neonatal mortality rate³³ and birth weight³⁴.

The immunisation coverage rate for children under the age of one in the LM was 71% compared to 60.6% for the Cape Winelands District Municipality. The number of malnourished children under five years (per 100,000) in 2020 was 3.2, while the neonatal mortality rate (NMR) (deaths per 1,000 live births before 28 days of life) was 9.9 and the low birth weight was 14.9, compared to 3.3, 7.9 and 15.1 for the Cape Winelands District Municipality. The child health care conditions in the LM are therefore similar to the district.

5.4.7 ECONOMIC OVERVIEW

The Economic activity in the LM plays a key role in terms of creating employment opportunities and addressing poverty and human development. The ability of households to pay for services such as water, electricity, sanitation, and refuse removal is dependent upon the ability to generate income from economic activities. A slowdown or deterioration in economic activities typically results in job losses and the inability of households to pay for services, which in turn impacts on municipal revenues and the ability to provide and maintain services and municipal infrastructure.

5.4.7.1 ECONOMIC SECTORS

In terms of key sectors, the local economy in the LM was dominated by the tertiary sector, which contributed 62% towards the Gross Domestic Product (GDP) for the Region (GDPR) 35 in 2018,

³¹ **Immunisation:** *The immunisation rate is calculated as the number of children immunised as a percentage of the total number of children less than one year of age.* Immunisation protects both adults and children against preventable infectious diseases. Low immunisation rates speak to the need for parents to understand the critical importance of immunisation, as well as the need to encourage parents to have their young children immunised.

³² **Malnutrition:** *Expressed as the number of malnourished children under five years per 100 000 people.* Malnutrition (either under- or over-nutrition) refers to the condition whereby an individual does not receive adequate amounts or receives excessive amounts of nutrients.

³³ **Neonatal mortality rate:** *Measured as the number of neonates dying before reaching 28 days of age, per 1 000 live births in a given year.* The first 28 days of life (neonatal period) represent the most vulnerable time for a child's survival. The Province's target for 2019 is 6.0 per 1 000 live births.

³⁴ **Low birth weight:** *Percentage of all babies born in facility that weighed less than 2 500 g.* Low birth weight is associated with a range of both short- and long-term consequences.

³⁵ Gross domestic product of a region (GDPR) is the standard measure of the value added created through the production of goods and services in a region (the LM) during a certain period.

followed by the Secondary Sector (25%) and the Primary Sector (13%). Within Tertiary Sector, the most important subsectors were Finance, insurance, real estate and business services (19% towards GDP) and Wholesale and retail trade, catering and accommodation (17% towards GDP), each contributing more than the entire Primary Sector. The Agriculture, forestry and fishing subsector within the Primary Sector contributed 13% towards GDP.

5.4.7.2 EMPLOYMENT

In terms of employment, the Tertiary Sector was made up 60% of all jobs in 2019, followed by the Primary Sector (26%) and the Secondary Sector (14%). However, in terms of subsectors the Agriculture, forestry and fishing sector was the most important sector in 2019, making up 26% of all jobs, followed by Wholesale and retail trade, catering and accommodation (24%), and Finance, insurance, real estate and business services (13%). The COVID-19 pandemic is likely to have resulted in job losses during 2020, extending into 2022/23.

5.5 HERITAGE AND PALAEOLOGY

5.5.1 ARCHAEOLOGY

In 2012 ACO Associates conducted an archaeological assessment prior to the raising of the Keerom Dam wall, west of the WEF site (Halkett, 2012). Although the assessment recorded several stone age artefacts around the periphery of the dam, "the majority of these are isolated finds (probably Early Stone Age (ESA) or Middle Stone Age (MSA)) amongst which no diagnostic formal elements were noted" (Halkett 2012:8).

Kaplan undertook two archaeological assessments to the north-east of the Khoe WEF. In 2010 he surveyed an area at Nougga proposed for agricultural expansion and recorded large numbers of stone artefacts dating from the Middle (MSA) and Later Stone Ages (LSA). He also located what he referred to as a LSA factory site with many stone artefacts, including several formal tools (Kaplan 2010).

In a survey for the proposed Vredefort solar energy facility south of Touwsriver, Kaplan (2015) found a widespread background scatter of mainly MSA lithics of the sort that is common in the Karoo. It is important to note that both of Kaplan's study areas were on a plain and located about 350 m lower than the mountainous and hilly Khoe WEF study area.

Most recently, Orton (2022) conducted an archaeological assessment for the proposed Ezelsjacht WEF which is located a little more than 1 km north of the Khoe WEF. The results of Orton's (2022) survey for the Ezelsjacht WEF reflected the well-established finding that archaeological materials and sites are not common in high-lying terrain, with only a few archaeological sites found. The most important was a LSA site with several retouched stone artefacts, and a scatter of LSA materials in a small dune field. Orton (2022) also reported some historical archaeological resources comprising mainly stone-walled kraals.

Due to the geology of the Karoo, caves and rock shelters are very rare and this means that most Karoo archaeological sites are open sites containing principally stone artefacts. Ostrich eggshell is sometime preserved and, occasionally, pottery on recent sites, but bone is rarely preserved except in rare, stratified contexts. Sites span the full range from the Early and Middle Stone Ages to the contact period between the Later Stone Age inhabitants of the region and the incoming European colonists within the last two centuries.

Potentially archaeologically sensitive areas in the landscapes like that of the Khoe WEF include:

- Springs, pans and watercourses which were a focus for human activity in the past, and prehistoric and colonial-era archaeological sites may be found around them.
- Outcrops of suitable stone which were quarried for tool making raw material during the Early, Middle and Later Stone Ages.
- Any accessible rock shelter or overhang on the skirts or slopes of hills and mountains. These have the potential to contain rock paintings and/or archaeological deposit.
- Rocky outcrops and boulders (particularly where dolerite is present), which may contain pre-colonial and, in some instances, historical rock engravings.

Evidence from other parts of the South African interior (see for example, Webley & Hart 2010, Van der Walt 2016, Orton 2017, Gribble 2022) indicates that the bulk of archaeological material and sites are in the river valleys. The higher ground like that to be occupied by the much of the Khoe WEF infrastructure is exposed and remote from resources such water, and the presence of archaeological sites and material in such areas is the exception rather than the rule.

5.5.2 PALAEOLOGY

Although no paleontological assessment has yet been conducted, a previous study conducted by Dr John Almond for the proposed Ezelsjacht WEF, which lies to the north of the Khoe WEF, provides a useful insight into the likely paleontology of the Khoe development site.

The proposed Khoe WEF is underlain by several coastal to shallow marine formations of the Table Mountain and Bokkeveld Groups (Cape Supergroup) of Early to Middle Devonian age (c. 410 – 390 Ma) (Almond 2022).

The Table Mountain Group, sandstone-dominated units (Rietvlei, Gamka and Hexrivier Formations) tend to build rocky ridges and scarps, while the intervening mudrock-dominated Bokkeveld Group subunits (Gydo, Voorstehoek and Tra Tra Formations) underlie, low-lying terrain and are generally poorly exposed at surface (Almond 2022).

The sandstones and pebbly beds of the fluvial / coastal marine Rietvlei Formation (uppermost Table Mountain Group) are associated in this area with low-diversity trace fossil assemblages, as well as a marine shelly invertebrate faunule of Early Devonian, Malvinokaffric aspect.

The Lower Bokkeveld Group (Ceres Subgroup) and overlying Waboomberg Formation of the Bidouw Subgroup contains rich assemblages of shallow marine invertebrates, trace fossils and rarer fish remains of the Malvinokaffric Faunal Province of Gondwana (Almond 2022).

According to SAHRA's palaeo-sensitivity map (see <https://sahris.sahra.org.za/map/palaeo>), the Khoe WEF footprint is in an area of generally very high or high paleontological sensitivity.

However, Almond's (2022) assessment for the Ezelsjacht WEF found that because of the high levels of tectonic deformation of the fossiliferous bedrock, and the marked near-surface weathering of both mudrock and sandstone within that project area, the actual paleontological sensitivity of the that project area is much lower than indicated on the SAHRA map.

According to Almond (2022), none of the fossil sites he recorded in the Ezelsjacht WEF area were very well preserved and all represent common, widely distributed forms, of limited scientific or conservation value.

Although it is possible that the same will apply in the Khoe WEF, which lies south Ezelsjacht and thus closer to the influence of the Cape Fold Belt, this can only be confirmed once a paleontological assessment has been conducted for the Khoe WEF area.

5.5.3 HISTORICAL BUILT ENVIRONMENT

According to the National Heritage Resources Act, any built structure older than 60 years is historical and enjoys protection under the Act.

Available historical survey diagrams for the farms within the Khoe WEF footprint indicate that their parent farms were well-established by the second half of the 19th century, and it is highly likely that the area had in fact been used and settled by farmers of European descent at least a century before.

The earliest colonial use of this area would have been for seasonal transhumant grazing. This was followed by a formal but still haphazard system of loan farms, where a farmer could rent an area of land, usually centered on a spring or water source, from the authorities at the Cape for a nominal annual fee. After the permanent British occupation of the Cape in the early 19th century, land tenure was formalised into a system of quitrents that resulted in the land divisions in the area that are in place today.

This long temporal span of agricultural use of the land suggests that there will be historical buildings and structures on particularly the older farms portions in the area. A comparison of the earliest 1:50,000 topographic map sheet for the area, which dates from 1969, with modern satellite imagery in a GIS indicates that the farming settlement nodes at Sandvlei (1/38), Sandvlei (11/38), Ou Muur (Farm Re 193) and Eendracht (Re 37) were already established in the 1960s and are thus likely to contain historical structures.

5.5.4 GRAVES AND BURIALS

This area has been formally settled by farmers of European descent since at least the mid-19th century, and less formally for longer than that. The historical farm complexes in the WEF area, and potentially also any older, abandoned settlement nodes, can be expected to have cemeteries associated with them, although a review of satellite imagery for this report did not find any clear evidence for such.

Pre-colonial graves could occur almost anywhere in the WEF area, but the remote and mountainous nature of much of the wind energy facility footprint suggests that they are unlikely in those areas. Such burials are seldom marked, except possibly by a cairn of stones, and often occurred in places like riverbanks, where soft sand made burial easy.

5.5.5 CULTURAL LANDSCAPE

The area proposed for the Khoe WEF is remote and the landscape is largely natural and with only a light cultural overlay comprised of features - fences, wind pumps, farm roads and occasional farm complexes - which reflect the historical and modern use of the area for agriculture.

In their Inventory and Policy Framework for Heritage and Scenic Resources, Winter and Oberholzer (2013) identified the Rooihogte Pass / Burger's Pass, built by Thomas Bain and dating to 1877, as having "high historical, technological and scenic value". A portion of the pass falls within the southern half of the Khoe WEF footprint. They also define the R318, which is straddled by the Khoe WEF as a "scenic / linking route of secondary importance".

Although the cultural landscape of the Khoe WEF is generally only lightly developed, it does contain a number of identified features of significances, and the construction of the WEF in this landscape will alter its visual character in particular.

5.6 VISUAL/ LANDSCAPE

Land cover consists primarily of low shrubland (fynbos) with scattered areas of bare rock and soil. The predominant land use is viticulture (vineyards) along the Hex River and areas to the south west and dryland and irrigated agriculture. Refer to Figure 5-27.

FIGURE 5-22: VITICULTURE IN THE STUDY AREA AND FARMSTEAD



FIGURE 5-23: LOW SHRUB LAND (FYNBOS) VEGETATION



The study area is populated with 44 people per km² within the local municipality. The most populated areas within the study area are the towns of De Doorns to the north west, Touws Rivier to the north east and further afield, Robertson to the south. Outside of these areas, there are isolated homesteads scattered around the study area.

FIGURE 5-24: EXAMPLE OF HOMESTEADS FOUND IN THE TOWN OF TOUWS RIVIER



Access to the site is via the R318, which is off the N1 national road. The N1 is a main connector that runs from Cape Town, through Bloemfontein, Johannesburg and Polokwane to the border of Zimbabwe. The R318 travels through the Khoe WEF site and is a regional road that connects the N1 between De Doorns and Touws Rivier. The Rooihoogtepas is a scenic mountain pass located on the R318, just south of the proposed site. An old railway system that used to run from De Doorn, via Touws Rivier to Beaufort West can be found to the north and east of the proposed site.

FIGURE 5-25: VIEW OF THE SITE FROM THE R318

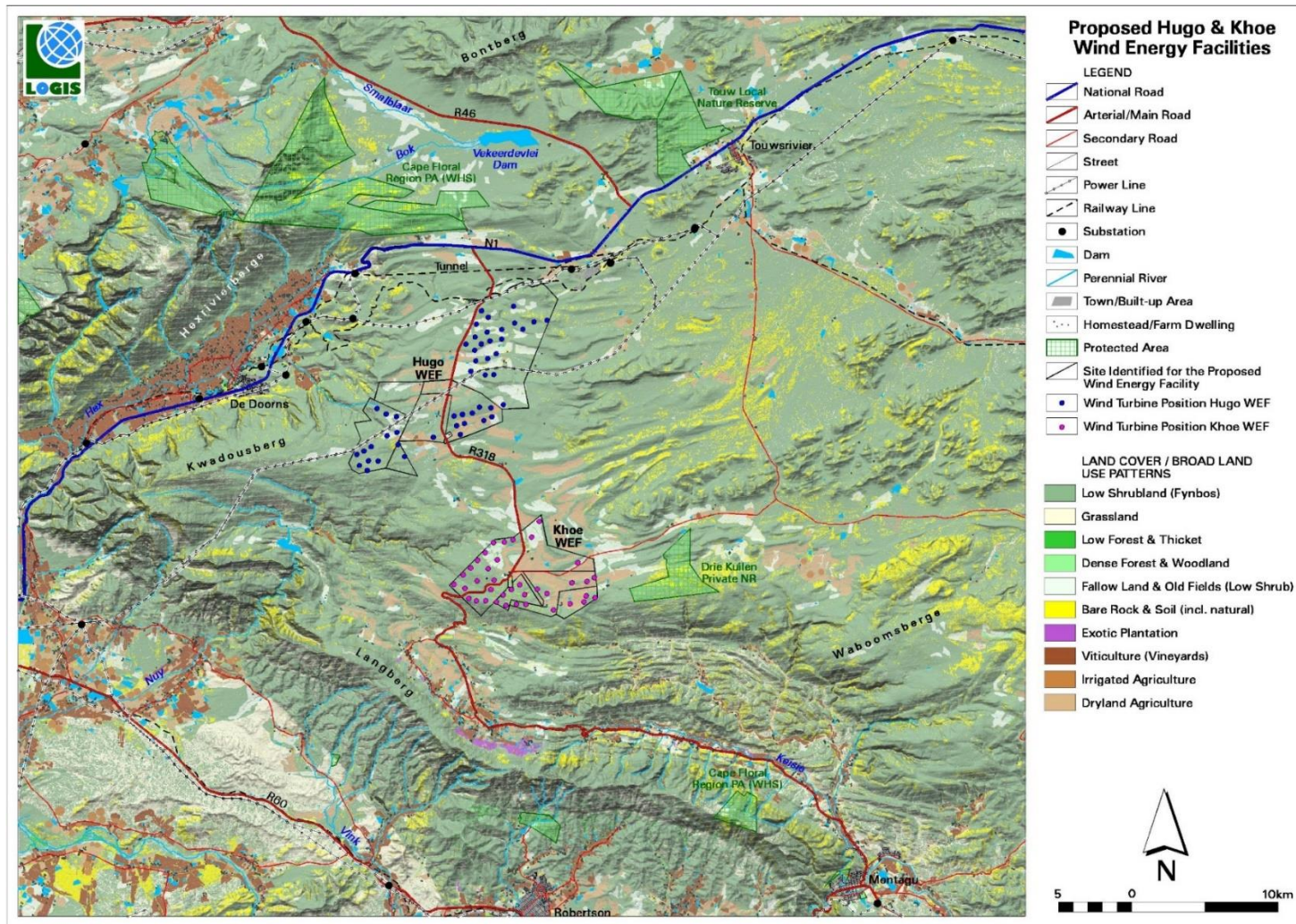


Other industrial infrastructure within the study area includes limited existing high voltage powerlines located to the north of the site and traversing through the site. Numerous substations are located to the north of the proposed Khoe WEF site. The proposed Touws Rivier CPV Solar Project is located 3 km north east from the proposed site.

FIGURE 5-26: EXISTING POWER LINES WITHIN THE STUDY AREA



FIGURE 5-27: LAND COVER AND BROAD LAND USE PATTERNS WITHIN THE STUDY AREA



5.7 TRAFFIC

The general location of the sites is made up of farmlands with rural unpaved Class 4 roads without names supporting movement between the various farms, as well as access to some of these land parcel. The access roads will be constructed or upgraded to provide access to the WEF from existing public roads. The exact location and design of the access roads will be determined, considering the environmental and social impacts, the technical feasibility, and the landowner agreements. The complete major road network is shown in Figure 5-28 in relation to the proposed WEF project area and described further in Table 5-2.

FIGURE 5-28: SURROUNDING MAJOR ROAD NETWORK

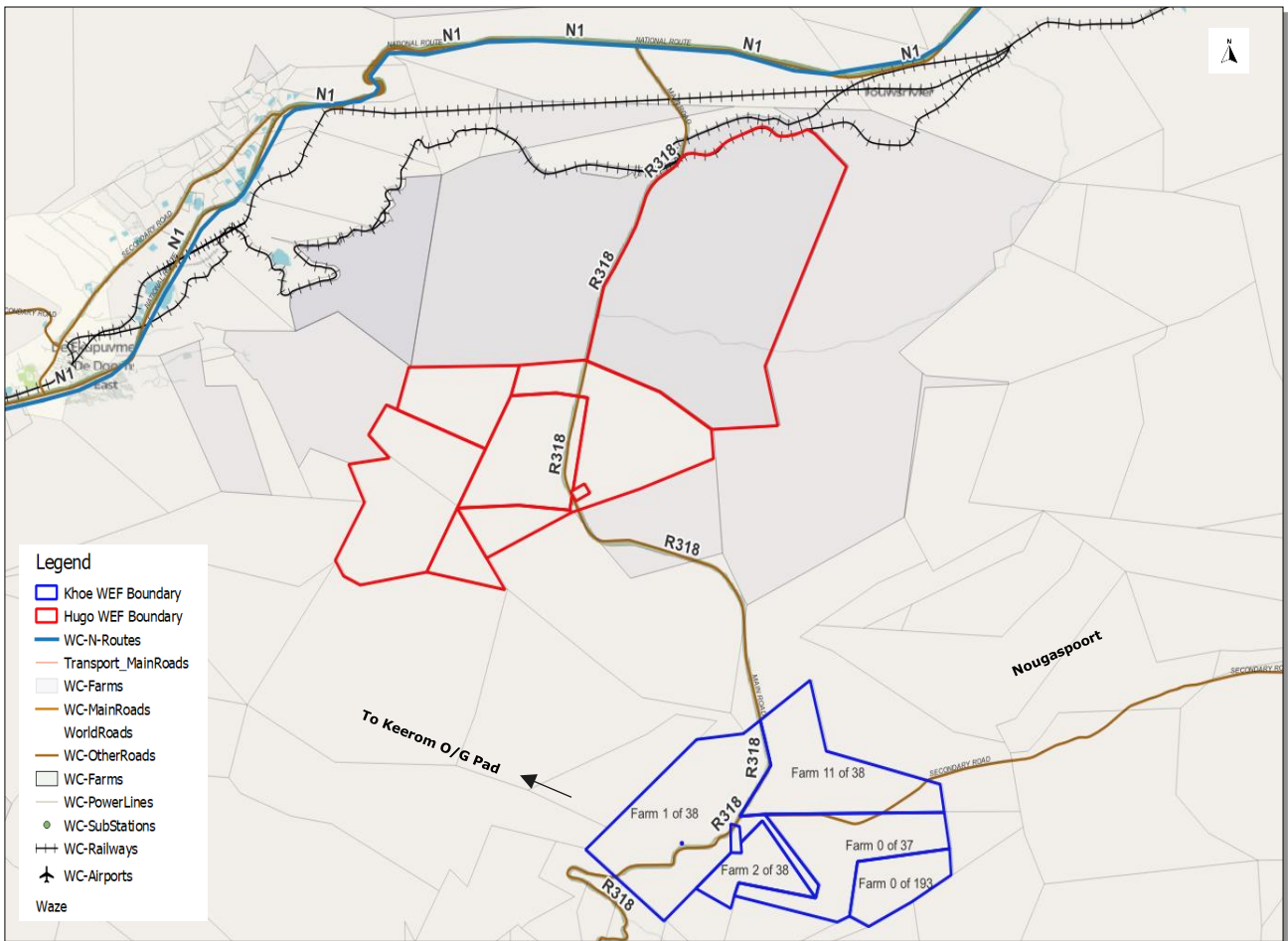


TABLE 5-2: MAJOR ROAD NETWORK

Road Name	Class	Description	Road Ownership
N1 (Worcester)	1	<ul style="list-style-type: none"> The N1 is a class 1 road, which is a principal arterial that provides high mobility and low access. It is a national route that runs from Cape Town through Bloemfontein, Johannesburg, Pretoria, and Polokwane to Beit Bridge on the border with Zimbabwe. The N1 is part of the Trans-African Highway network and forms the Cape to Cairo Road with the N4 and the A1 in Zimbabwe. 	SANRAL

Road Name	Class	Description	Road Ownership
		<ul style="list-style-type: none"> The N1 is also a scenic route that offers views of the Cape Winelands, the Hex River Valley, the Karoo, the Free State, and the Waterberg. The traffic flows on the N1 vary according to the time of day, the season, the weather, and the road conditions. The N1 is one of the busiest roads in South Africa, especially in the urban areas of Cape Town, Johannesburg, and Pretoria. The N1 experiences high traffic volumes and congestion during peak hours, holidays, weekends, and special events. 	
R318	3	<ul style="list-style-type: none"> The R318 road is a class 4 road, which is a collector street that provides access and activity. The R318 road is a provincial route in South Africa that runs from N1 near De Doorns through Montagu to R60 near Ashton. The R318 road also connects to the R62 road, which is a popular tourist route that links Cape Town and Port Elizabeth. 	Western Cape Government Department of Transport and Public Works, South African National Roads Agency (SANRAL),
Nougaspoort Road	4	<ul style="list-style-type: none"> The Nougaspoort Road is a road in the Western Cape Province of South Africa that runs from Touws River to Montagu. The Nougaspoort Road is partly paved and partly gravel. the Nougaspoort Road is a class 4 road, which is a collector street that provides access and activity. 	Western Cape Government Department of Transport and Public Works
To Keerom O/G Pad Road	4	<ul style="list-style-type: none"> The Keerom O/G Pad road is a class 5 road, which is a local street that provides low mobility and high access. The quality of the Keerom O/G Pad road is not very high, as it is subject to frequent damage and deterioration due to the heavy and frequent traffic of trucks and machinery that transport equipment and materials to and from the O/G Pad. The road also suffers from erosion, potholes, and dust, which affect the safety and comfort of the road users. 	Western Cape Government Department of Transport and Public Works

6. ALTERNATIVES ASSESSMENT

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), an assessment report must contain consideration of all alternatives, which can include activity alternatives, site alternatives, location alternatives and the "No Development" alternative. At a minimum, this chapter must address:

- The consideration of the No Development alternative as a baseline scenario;
- A comparison of reasonable and feasible selected alternatives; and
- The provision of reasons for the elimination of an alternative.

Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable", and that I&APs should be provided with an opportunity to provide input into the process of formulating alternatives. In this instance, this chapter provides an overview of the alternatives that have been considered for this development.

6.1 THE NO DEVELOPMENT SCENARIO OR "NO-GO OPTION"

This scenario assumes that the proposed development does not proceed. It is equivalent to the future baseline scenario in the absence of the proposed development. Relative to the proposed development, the implications of this scenario include:

- The land-use remains agricultural, with no further benefits derived from the implementation of a complementary land use;
- There is no change to the current landscape or environmental baseline;
- No additional electricity will be generated on-site or supplied through means of renewable energy resources. This would have negative implications for the South African government in achieving its proposed renewable energy target, given the need for increased generation;
- There would be a lost opportunity for South Africa to generate renewable energy. This would represent a significant negative social cost;
- There is no opportunity for additional employment (permanent or temporary) in the local area where job creation is identified as a key priority; and
- The national and local economic benefits associated with the proposed project's REIPPPP commitments and broader benefits would not be realised.

The purpose of the proposed development is to generate renewable electricity and export this to the national grid. Other socio-economic and environmental benefits will result from the proposed development such as:

- Reduced air pollution emissions - burning fossil fuels generates CO₂ emissions, which contributes to global warming. Emissions of sulphurous and nitrous oxides are produced which are hazardous to human health and impact on ecosystem stability.
- Water resource saving – conventional coal-fired power stations use large quantities of water during their cooling processes. WEFs require limited amounts of water during construction and a minimal amount of water during operation. As a water stressed country, South Africa needs to be conserving such resources wherever possible.

- Improved energy security – renewables can be deployed in a decentralised way close to consumers, improving grid strength while reducing expensive transmission and distribution losses. Renewable energy projects contribute to a diverse energy portfolio.
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited.
- Sustainable energy solutions – the uptake of renewable energy technology addresses the country's energy needs, generation of electricity to meet growing demands in a manner which is sustainable for future generations.
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The development compliments agriculture by providing an additional income source, without excluding agriculture from the land, or decreasing production. Therefore, the negative agricultural impact of the no-go alternative is more significant than that of the development, and so, purely from an agricultural impact perspective, the proposed development is the preferred alternative between the development and the no-go.

The 'No Development' alternative would not assist the government in addressing climate change, energy security and economic development.

If the project were not implemented, then the site would stay as it currently is. Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with clean, renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producers of carbon emissions in the world, this would represent a significant negative social cost. Addressing climate change is one of the benefits associated with the implementation of this proposed development. Climate change is widely considered by environmental professionals as one of the single largest threats to the environment on a local, national and global scale.

Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view, and a wind energy installation is more suitable for the site due to the high wind resource.

The 'no-go' alternative is the option of not undertaking the proposed WEF project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

6.2 SITE SELECTION

The Applicant identified the Khoe WEF after conducting a series of pre-feasibility assessments by considering aspects such as climatic conditions (wind speed databases, pre-dominant wind directions), grid connection scenarios, site geography and topography, ecological features and site accessibility.

Feasibility studies undertaken by the Project Applicant indicated that the Khoe WEF site is suitable to develop and operate a wind farm as it satisfies the following criteria:

- Feasibility of access for wind turbine delivery as the site is easily accessible from the national road;

- Viable wind resource;
- The surrounding area is not densely populated;
- The proposed site is largely previously transformed agricultural land and current land use is grazing;
- Willingness of landowner to host a wind farm on their property; and
- No environmental fatal flaws identified in the screening assessment.

The unique feature of this site eliminates the possibility of alternatives with similar site conditions. Alternatives are restricted to on-site aspects such as turbine footprints and layouts, roads, and related infrastructure options.

At this phase, it was concluded, based on available information, that the Khoe WEF site is suitable for the construction and operation of the WEF.

6.3 DESIGN EVOLUTION ALTERNATIVES

Following the selection of a suitable site, consideration is given to the design of the WEF. It is important that wind turbines are sited in the optimum position to maximise the wind energy yield whilst minimising environmental impacts as far as possible.

Information collated during the scoping phase will be used to inform the design of the WEF progressively. Best practice advises that the EIA should be an iterative process rather than a post design environmental appraisal. In this way, the findings of the technical environmental studies will be used to inform the design of a development.

This approach will be adopted with respect to this proposed development, and where potentially significant impacts are identified, efforts will be made to avoid these through evolving the design of the proposed development. This will be referred to as mitigation to be embedded in the layout and design, or 'embedded mitigation'.

A preliminary layout was produced showing suggested locations of wind farm turbines on the site. This layout will be adjusted, based on the initial scoping assessment and specialists' findings. This adjusted layout will be called the 'preferred layout' and will be assessed in further detail during the EIA Phase.

6.4 TECHNOLOGY ALTERNATIVES

Additional renewable energy technologies include hydro-electric power, photovoltaic solar or concentrated solar power. The site itself has no resource for hydro-electricity. Solar electricity generation would require a much greater infrastructure footprint to generate the equivalent energy of the proposed WEF.

Based on the site's physical characteristics and existing land uses, the renewable energy technology best suited to the site, considering the potential environmental impacts, is a WEF, however the specific design at the site should be informed by the EIA process.

Various wind turbine designs and layouts will be considered for the site to maximise the electricity generation capacity and efficiency, whilst considering environmental constraints.

Two alternatives for the placement of the laydown area and on-site substation were provided to specialists. The sensitivities and impacts associated with the placement of either of these alternatives is to be assessed further in the EIA phase.

7. DESCRIPTION OF THE PREFERRED ALTERNATIVE

7.1 WIND ENERGY FACILITY COMPONENTS

It should be noted that as the design of the proposed development is not yet finalised, all dimensions are maximums, as is required by the EIA process. The final design may include infrastructure which is of equal or less than dimensions to those stated below, but not more than. This is to ensure that the impacts associated with the project are assessed adequately during the EIA phase.

7.1.1 WIND TURBINE GENERATORS AND HARDSTAND AREAS

The proposed Khoe WEF will comprise up to 38 turbines (each turbine with an approximate capacity of 7.5 MW) with a maximum output capacity of up to 290 MW with an anticipated lifespan of 20-25 years.

The turbines will be three-bladed horizontal-axis design with a Wind Turbine Generator (WTG) hub height from ground level is anticipated to be up to 150 m, with a blade length and rotor diameter of up to 100 m and 200 m respectively. The height of the complete structure is approximately up to 250 m. The exact turbine model has not yet been selected and will be identified based on the wind resource distribution, technical, commercial and site-specific considerations.

The proposed turbine footprint and associated facility infrastructure will cover an area of up to 85 ha depending on the final design. The aerial extent of the total area is approximately 4,113 ha.

Each turbine will require a transformer that will be located within the turbine tower. Each turbine will have a circular foundation which will be placed alongside the hardstand, resulting in that area being permanently disturbed by the turbine foundation. The dimensions of the turbines provided in this report are preliminary and will be finalized at a later stage of the Project.

The precise location of the turbines within the WEF site has not yet been finalised and will be confirmed during the EIA process, following the assessment of technical and environmental constraints. Figure 7-1 to Figure 7-4 indicate a typical wind energy operation sequence as well as the different components of a wind turbine.

FIGURE 7-1: SIMPLE ILLUSTRATION OF A TYPICAL WIND ENERGY FACILITY OPERATING SEQUENCE

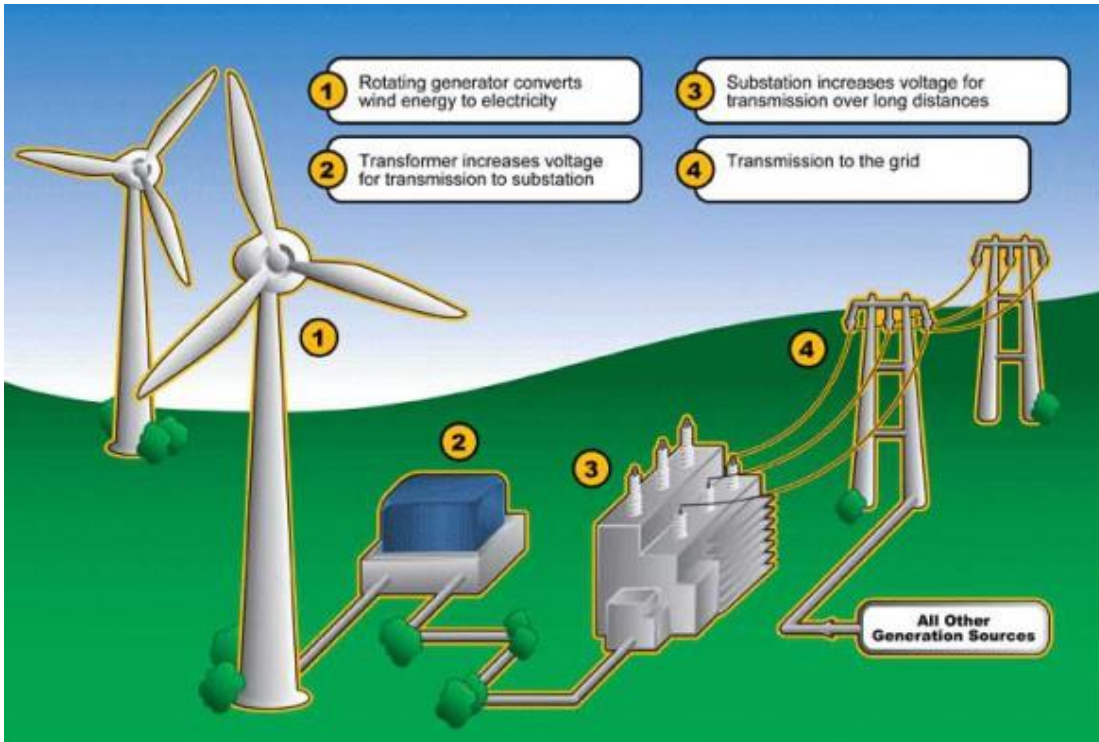


FIGURE 7-2: AN ILLUSTRATION OF TYPICAL COMPONENTS OF A WIND TURBINE GENERATOR (WTG)

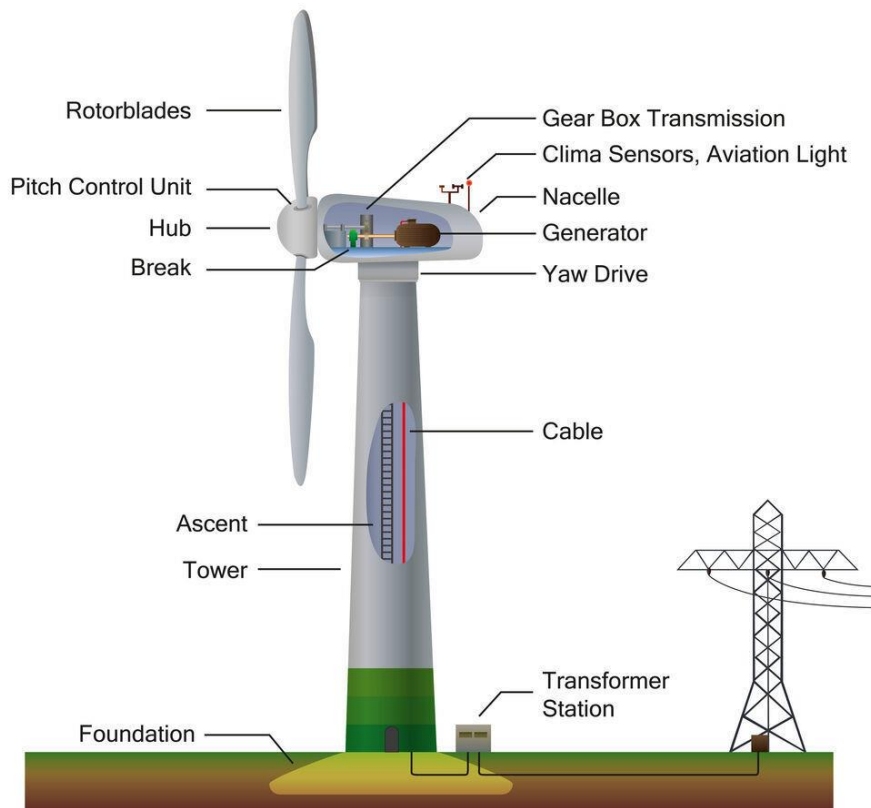


FIGURE 7-3: THE INSIDE OPERATION OF A TYPICAL WIND TURBINE

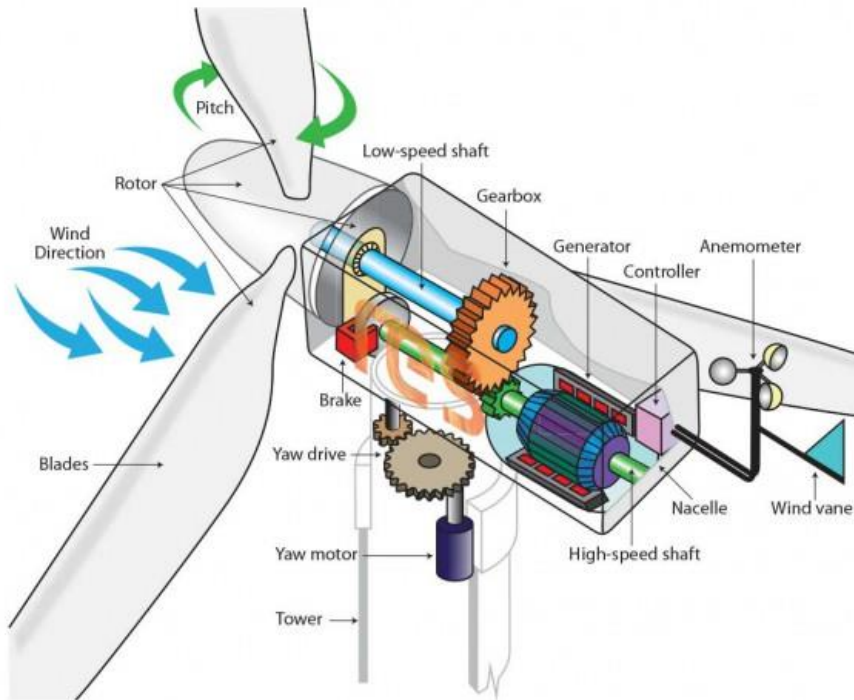


FIGURE 7-4: ILLUSTRATION OF A TYPICAL TURBINE HARDSTAND AND LAYDOWN AREA



7.1.2 ELECTRICAL CABLING AND ON-SITE SUBSTATION

It is proposed that an on-site substation with a capacity up to 132 kV with an up to 33 kV overhead / underground powerline will be installed. It is unknown at this stage how long the connection to the grid will be, or what route the cabling will be installed. Due to the complexity related to the routing of the transmission line, it will not form a part of this application. The intention is for the internal project cabling to follow the road network to the on-site facility substation.

The on-site substation is expected to have a footprint of 2.5 ha. It will be used to facilitate the connection to the national grid. The turbines will be connected to the on-site substation using an underground cabling network with a capacity of 33kV.

7.1.3 BATTERY ENERGY STORAGE SYSTEM

The BESS is expected to have a total footprint of approximately 5 ha. The function of the BESS will be to store peak kinetic energy produced by the Khoe WEF for use in the following ways:

- To power the operation of the proposed development when the national grid is strained by high (or peak) demand, often resulting in load-shedding.
- To provide excess generation to the national grid which will assist with stabilizing electricity supply during peaks and troughs of demand.
- To reduce the impact caused by the variability and limited predictability of wind generation.

The preferred battery technology being considered would be Solid-State, Lithium Ion (Li-Ion) batteries, which consists of multiple battery cells that are assembled to form module. Each cell contains a positive electrode, a negative electrode, and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (like shipping containers) and these containers are delivered pre-assembled to the project site.

The containers will have approximate dimension ranges of height 5 m, width –3 m, length –20 m. The containers are raised slightly off the ground and are banded to prevent possible environmental damage resulting from any equipment malfunction. The proposed development is considering the option of stacking these containers vertically to a maximum of two container layers or a height of up to 10m.

The BESS storage capacity has not been finalized at this point. The BESS will be placed on a concrete footprint of up to 5 ha. The BESS will be in close proximity to the on-site substation, will be fenced off and will be linked to the substation via internal cables and will not have any additional office / operation / maintenance infrastructure as those of the substation.

The following figures are examples of BESS in other facilities for ease of reference. This proposed development will have similar project components and will be designed in a similar manner.

FIGURE 7-5: TYPICAL REPRESENTATION OF HOW BATTERIES AND BATTERY MODULES ARE HOUSED AND ASSEMBLED

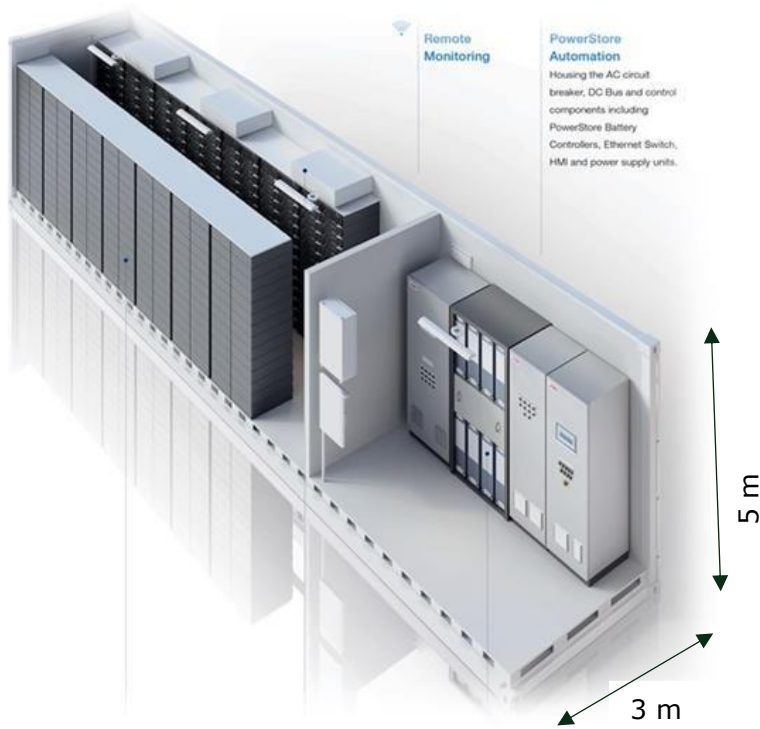


FIGURE 7-6: SOLARCITY'S TESLA BATTERY STORAGE FACILITY, HAWAII



FIGURE 7-7: A STOCK IMAGE OF A SIMILAR DEVELOPMENT WITH AN ON-SITE SUBSTATION AND BESS.



7.1.4 LAYDOWN AREAS AND SITE OFFICES

Individual turbine temporary laydown areas including crane boom laydown areas, blade laydown areas and other potential temporary areas will be up to a maximum of 6 ha. The temporary warehouse and site camp establishment, as well as the concrete batching plants will have a footprint of up to 2 ha. As such, the footprint of the construction laydown area will be up to 8 ha in aerial extent.

7.1.5 INTERNAL SITE ACCESS ROADS

Permanent roads will be up to 4.5 m wide, with a servitude of up to 13.5 m, which includes additional space required for cut and fill, side drains and other stormwater control measures. Furthermore, the servitude will be used as turning areas and vertical and horizontal turning radii to ensure safe delivery of the WTG components. Internal roads will provide access to each turbine, the on-site substation hub (which includes substation infrastructure, BESS and Balance of Plant area). All roads may have underground cables running next to them. The 13.5 m wide road servitude will be temporarily impacted during construction and rehabilitated to 4.5 m wide after construction..

7.2 SERVICE PROVISION

7.2.1 HEALTH AND SAFETY

The IFC guidelines for Health and Safety are based on the Occupational Health and Safety Act (OHSA) of America and are subsequently aligned with South African legislation (OHS Act no 85 of 1993). It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks personnel working at the proposed development site.

The FE Hugo & Khoe (Pty) Ltd will institute a Health and Safety (H&S) Plan prior to construction, for all persons working at the proposed development site. The policy will need to evaluate the risks and impacts to the health and safety of the affected community during the design,

construction and operation of the proposed development, and establish preventive measures to address them in a manner commensurate with the identified risks and impacts within this assessment. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.

7.2.2 WATER REQUIREMENTS

Water will be sourced from either the Local Municipality, supplied from a contractor and trucked in, from existing boreholes located within the application site or from a new borehole if none of these options are available. Note, however, that should municipal water supply not be confirmed, the Applicant will investigate other water sources considering any necessary and relevant legal requirements.

High water use ($\pm 24,500 \text{ m}^3$) is only anticipated during the first twelve months of the construction phase mainly for purposes of the turbine foundations, roads and dust suppression. Thereafter the water usage will decrease drastically. The anticipated water usage for the proposed development for the duration of the construction phase includes the following:

- Drinking;
- Ablution facilities;
- Access Road construction;
- Dust suppression;
- Fire-fighting reserve;
- Cleaning of facilities; and
- Construction of foundations for the WEF infrastructure, i.e., turbines and substation, etc.

The water use requirement during the operational phase will be primarily for human consumption and sanitation purposes. Approximately 90 m^3 per annum is anticipated to be consumed for the life of the WEF (20 – 25 years).

7.2.3 STORMWATER MANAGEMENT

Stormwater drainage systems will be constructed and kept separate from the sewerage effluent system on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems is not likely to contain any chemicals or hazardous substances and will be released into the surrounding environment based on the natural drainage contours.

Wastewater and sludge will be managed by local authorities and service providers. All wastewaters will be handled in accordance with the Guidelines for the Utilisation and Disposal of Wastewater Sludge Volumes 1 to 6 (Herselmann & Snyman, 2006).

7.2.4 WASTE

During the construction phase, it is estimated that the Khoe WEF would generate solid waste which includes (but is not limited to) packaging material, building rubble, discarded bricks, wood, concrete, plant debris and domestic waste. Solid waste will be collected and temporarily stockpiled within designated areas on site during construction, and thereafter removed and disposed of at a nearby registered waste disposal facility on a regular basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

During the operational phase, the WEF will typically produce minor quantities of general non-hazardous waste mainly resulting from the O&M and office areas. General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed and disposed of at a nearby registered waste disposal facility (or registered landfill) on a regular

basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

Any hazardous waste such as chemicals or contaminated soil as a result of spillages, which may be generated during the construction and operational phases, will be temporarily stockpiled within a designated area on site and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

It must be noted that waste handling is not yet confirmed, and is to be confirmed at a later stage through municipal or private channels. Similarly, the volumes of waste to be generated during construction and operation phases cannot be confirmed at this stage. This being said, the Project will adopt the 4R principle for solid waste management, which includes (in order or priority) to:

- Refuse single use plastics as much as possible;
- Reduce the use of non-recyclable products;
- Reuse solid wastes where possible to convert it into other useful products; and
- Recycle all wastes where possible.

7.2.5 SEWAGE

The WEF will require sewage services during the construction and operational phases. Low volumes of sewage or liquid effluent are estimated during both phases. Liquid effluent will be limited to the ablution facilities during the construction and operational phases. Portable sanitation facilities (i.e., chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a registered contractor on a regular basis. The use of conservancy tanks or septic tanks for ablution as part of the operational phase is being considered by the applicant.

7.2.6 ELECTRICITY

Electricity on site will be from on-site diesel generators as well as sourced from the national grid distribution networks.

7.3 EMPLOYMENT

In addition to the workforce required during the construction phase (which is anticipated to be approximately 200 to 250 staff), the Project is anticipated to require an additional ~20 staff during the operational phase of the Project.

7.4 SUMMARY OF PROJECT INFORMATION

WEF Technical Details

WEF Technical Details Components	Description/Dimensions - Khoe
Maximum Generation Capacity	up to 290MW
Turbine Capacity	Up to 7.5 MW
Type of technology	Onshore Wind
Number of Turbines	Up to 38
WTG Hub Height from ground level	up to 150m

WEF Technical Details Components	Description/Dimensions - Khoe
Blade Length	up to 100m
Rotor Diameter	up to 200m
Structure height (Tip Height)	up to 250m
Structure orientation	Wind regiment dependent
Area occupied by both permanent and construction laydown areas	<ul style="list-style-type: none"> • Concrete turbine foundations - approximately up to 1000m² per turbine • Each turbine will have a hardstand area of approximately up to 7500m² per turbine • Temporary laydown areas (with a combined footprint of up to 9 ha) which will accommodate the boom erection, storage and assembly area; • A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha)
Operations and maintenance buildings (O&M building) with parking area	up to 1 HA
Site Access	Via the R318
Area occupied by inverter transformer stations/substations	up to 2.5 HA
Capacity of on-site substation	132/33kv
Battery Energy Storage System footprint	up to 5 HA
BESS type	Lithium-ion technology
BESS Alternatives (site, technology, design and layout)	Same as above. See layout for design and position
Width of internal roads	Access roads to the site and between project components with a width of approximately 4.5 m and a servitude of 13.5 m.
Proximity to grid connection	This has not been determined at this stage of the Project.
Internal Cabling	Cabling between the turbines, to be laid underground where practical.
Height of fencing	Up to 3 metres

8. NEED AND DESIRABILITY

The EIA Regulations, 2014, as amended state that the objective of the scoping process includes to, through a consultative process, motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.

8.1 THE NEED & DESIRABILITY OF RENEWABLE ENERGY FACILITIES

WEFs can play a role in mitigating or reducing climate change, addressing South Africa's energy resource constraints and producing low-cost energy. In addition, operating WEFs in South Africa contribute significantly to the economic development of the areas in which they are located through the requirements of the REIPPPP adjudication process. This section of the report highlights the national, provincial and local plans and policies that are in support of renewable energy facilities. Throughout this section, it is demonstrated that at all levels of governance, policy supports the development of renewable energy to address energy supply issues, and to promote economic growth in South Africa.

8.1.1 MITIGATING CLIMATE CHANGE

The scientific consensus is that climate is changing and that these changes are in large part caused by human activities³⁶. Of these human activities, increase in carbon dioxide (CO₂) levels due to emissions from fossil fuel combustion is regarded as a significant contributor to anthropogenic climate change.

As explained in National Treasury's Carbon Tax Policy Paper (May 2013)³⁷, addressing the challenges of climate change through facilitating a viable and fair transition to a low-carbon economy is essential to ensure an environmentally sustainable economic development and growth path for South Africa. Further the Policy Paper states that the South African government is of the view that South Africa needs to reduce its greenhouse gas emissions while working to ensure economic growth, increase employment, and reduce poverty and inequality³⁸.

Renewable energy projects will play a significant role in meeting the targets of the Paris Agreement and assisting the transition to a low-carbon economy.

8.1.2 DIVERSIFICATION AND DECENTRALISATION OF SUPPLY

With its abundant coal supplies, approximately 89% of South Africa's energy needs are currently met through coal-fired generators, with nuclear energy contributing approximately 5% and the balance by pumped storage and hydroelectric (3.6%), renewable energy (2.4%) and gas turbines (0.1%). Electricity generation is dominated by state-owned power company Eskom, which currently produces over 96.7% of the power used in the country.

A diversification of energy supplies and producers, particularly with respect to renewable energy sources, would lead to greater energy security and economic and environmental benefits.

³⁶ <http://adsabs.harvard.edu/abs/2013ERL.....8b4024C>.

³⁷ National Treasury Carbon Tax Policy Paper. Available online
<http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf>

³⁸ <http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf>

The deployment of various renewable technologies increases the diversity of electricity sources and, through local decentralised generation, contributes to the flexibility of the system and its resistance to central shocks.

According to the International Energy Agency, *"renewable energy resources ... exist virtually everywhere, in contrast to other energy sources, which are concentrated in a limited number of countries. Reduced energy intensity, as well as geographical and technological diversification of energy sources, would result in far-reaching energy security and economic benefits."*³⁹

The renewables programme has resulted in over 6,000 MW of generation capacity being allocated to bidders across a variety of technologies, principally in wind and solar in South Africa. Progress in this regard has been made under the DoE REIPPPP. According to the DoE's Integrated Resource Plan for Electricity 2010-2030, South Africa is aiming to procure 9200 MW of wind power by 2030.

8.1.3 ECONOMIC DEVELOPMENT AND JOB CREATION

The REIPPPP requires Economic Development ("ED") commitments from onshore wind energy projects and projects are adjudicated according to their ED commitments. The main ED beneficiaries of approved projects are currently communities living within a 50 km radius of renewable energy facilities. Projects are bid and thereafter adjudicated according to tariff (70%) and Economic Development (30%). There is therefore an incentive for projects to focus on Economic Development of the Local Community and to assign as much revenue, jobs, procurement etc. to local people as well as South African companies and people as possible to stand a chance of having a successful project.

TABLE 8-1: REIPPP POINTS WEIGHTING

Economic Development Elements	Weighting
Job Creation	25%
Local Content	25%
Ownership	15%
Management Control	5%
Preferential Procurement	10%
Enterprise Development	5%
Socio-Economic Development	15%
Total	100%
Total points	30 points

A number of these elements will have a significant and positive impact on the Local Community. In terms of job creation, bidders are required to indicate the actual number of jobs that will be created for South African citizens, Skilled People, Black People, Skilled Black People and Citizens from the Local Communities. Significant skilled and unskilled job opportunities will be created in the Local Communities, particularly during the construction period.

³⁹ www.iea.org/textbase/npsum/ETP2012SUM.pdf

For Ownership, bidders are required to indicate the total shareholding of the Project Company in the hands of Black People and Local Communities. The minimum ownership percentage for Local Community is 2.5% but projects have committed up to 40% Local Community Ownership in order to have a competitive project. Broad-based community trusts are established as a vehicle for Local Community Ownership to receive dividend revenue from an operating project that will be invested in socio-economic development imperatives as determined by trustees. The ownership stake is funded either through debt or through equity partners (“a free-carry”).

The Socio-Economic Development and Enterprise Development commitments require a percentage of gross revenue from the operating wind farm to be invested in education, health, small business development etc. Projects are required to commit at least 1% of gross revenue towards socio-economic development. As an indication, 1% of gross revenue of a hypothetical 140 MW wind farm, with a capacity factor of 35% and a tariff of 80 c/kWh would equal approximately R3.5 m/year (and R68 million over the 20-year operation period of a project). Projects in the REIPPPP receive additional points if the socio-economic and enterprise development investments are committed to be invested in the Local Community.

WEFs in South Africa will create skilled and unskilled jobs, particularly during the construction period. Under the REIPPPP, projects are incentivised to maximise the direct job creation opportunities, particularly for people in the communities surrounding the project.

WEFs tend to be constructed in rural areas with small communities and limited infrastructure and social amenities. A wind farm would create indirect jobs in accommodation, catering and other services that would support a wind farm and cater for the material and social needs of wind farm workers.

Localisation is considered one of the major contributors to job creation and general improvement of the economy of South Africa. Localisation through the construction of new manufacturing facilities to build wind turbine towers and other turbine components in South Africa is currently progressing.

Wind energy can provide technical skills to South Africans and thus improve the technical skills profile of the country and the regions where wind energy facilities are located. Through the REIPPPP, developers’ own initiatives and through support from international donor agencies, a number of young South Africans are being trained on various aspects of wind farm construction and operation.

These projects, if successfully implemented, have the potential to transform for the better key development areas of South Africa and would assist South Africa in meeting its development goals, while meeting its carbon emission reduction targets as per international protocols.

8.2 POLICIES IN SUPPORT OF RENEWABLE ENERGY

Renewable energy is supported in terms of meeting the country’s climate change goals, and in terms of reducing the country’s dependence on fossil fuels as the main source of meeting the country’s electricity requirements. The National Climate Change Adaptation Strategy⁴⁰ (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with

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https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10_november2019.pdf

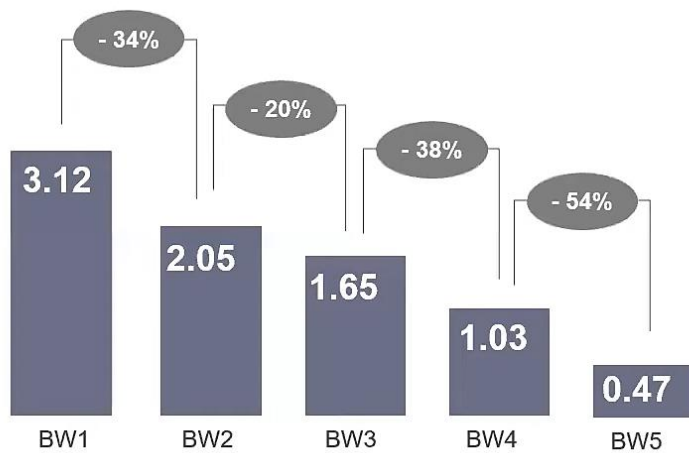
the changing climate conditions and the affect it has on various sectors. An action in support of this development is the approach to “create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas”. “This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions”.

Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework, Integrated Resource Plan (IRP) and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Northern Cape Provincial Development and Resource Management Plan / Provincial Spatial Development Framework (PSDF) of 2020, Pixley Ka Seme District Municipality Integrated Development Plan (IDP) for 2022-2027, and Spatial Development Framework; and the Ubuntu Local Municipality Integrated Development Plan for 2022 - 2023.

The need and desirability for renewable energy developments play a role in South Africa meeting its energy and climate change targets and provides a socio-economic boost at the local level in areas that are in need of it.

Aside from environmental considerations, investment in renewables have been driven by dramatic reductions in their costs. Plate 5.1 shows this trend and that in the six years between bid windows 4 and 5, the average price of electricity purchased through the REIPPPP fell by 54% (Magoro, 2021).

PLATE 8-1: REIPPP AVERAGE BID PRICES IN APRIL 2021 TERMS (MAGARO, 2021)



8.3 NEED & DESIRABILITY GUIDELINE

Reference is made to the DFFE 2017 Guideline on Need and Desirability⁴¹ which states that while the “concept of need and desirability relates to the type of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which need refers to time and desirability to place – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and

⁴¹DEA (2017) Guideline on Need and Desirability. Department of Environmental Affairs (DEA), Pretoria, South Africa, ISBN: 978-0-9802694-4-4.

desirability can be equated to wise use of land – i.e. the question of what the most sustainable use of land is.”

The guidelines pose questions that should be considered in this investigation, which will be addressed in EIA Phase.

9. PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) follows the requirements of Section 24 (5) and Chapter 6 (41, 42, 43, and 44) of GN R. 326 of NEMA EIA Regulations, 2014 (as amended), as well as the Public Participation Guidelines in terms of NEMA, 1998 EIA Regulations, 2014.

A PPP is an important part of any application. The aim of PPP is:

- To inform I&APs of the proposed project;
- To identify and respond to issues, comments and concerns as raised by I&APs;
- To promote transparency of the project and its potential consequences and ensure I&APs understanding of the proposed project and associated activities;
- To facilitate open dialogue and liaise with all I&APs;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed project; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report (CRR).

9.1 PRE-SCOPING PHASE PUBLIC PARTICIPATION PROCESS

The initial notification phase gives opportunity to the public to register as an I&AP and receive all correspondence and notification regarding the application process. During this phase the following was conducted:

- Site notices were erected on the site boundary in October 2023;
- Adverts were also placed in one provincial and one local newspaper on 14 December 2023.
- I&APs were provided with the Background Information Document (BID) on 14 December 2023 via email

9.2 SCOPING PHASE PUBLIC PARTICIPATION PROCESS

I&APs were able to register throughout the duration of the Scoping PPP and all registered I&APs were kept informed about the progress of the application.

The following tasks were undertaken during the scoping process:

- All issues, underlying concerns and suggestions raised by I&APs are understood, documented and addressed; and
- Areas that require further consideration or specialist investigation are identified and feedback is provided to I&APs.

The PPP for this Scoping and EIA process takes cognisance of the DFFE (2017) Public Participation Guidelines in terms of NEMA EIA Regulations, as amended.

Throughout the process, stakeholders were encouraged to communicate with the PPP team to raise issues, ask questions or make suggestions. Communication was through telephonic means and in written form. All issues raised during the Scoping PPP were included into the CRR, and responses have been provided by the project team.

The Draft Scoping Report was submitted to the CA (DFFE) on 29 February 2024. It was also released for public comment for a period of 30 days from 29 February 2024 to 02 April 2024. All I&APs registered on the stakeholder database will be notified of the project and of the availability of the DSR for public comment. A CRR will be compiled, recording comments and/or queries received and recording the responses provided.

Notification regarding the submission of the Final Scoping Report (FSR) for DFFE approval, which will include a CRR, will be sent to registered I&APs, key stakeholders, and organs of state.

9.3 EIA PHASE PPP

The following PPP activities will be undertaken as part of the EIA Phase engagement:

- Notifications will be sent to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the Draft EIA Report for their review and comment for a period of 30 days;
- The CRR will be updated, recording comments and/or queries received and recording the responses provided; and
- Notification regarding the submission of the Final EIA for DFFE approval, which will include the CRR, will be sent to registered I&APs, key stakeholders, and organs of state.

9.4 EA DECISION PHASE

Notifications will be sent to all registered I&APs, key stakeholders, and organs of state to inform them of the decision by the DFFE and the appeal procedure.

Proof of the PPP undertaken to date will be included in the EIA Report.

10. SCOPING PHASE ASSESSMENTS OF POTENTIAL IMPACTS

10.1 SOIL AND AGRICULTURAL POTENTIAL

An agricultural impact is a change to the future agricultural production potential of land. In most developments, this is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential. The significance of the impact is a direct function of the following three factors:

- The size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased)
- The baseline production potential (particularly cropping potential) of that land
- The length of time for which agriculture will be excluded (or for which potential will be decreased).

In the case of wind farms, the first factor, size of footprint, is so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production potential the land has, and regardless of the duration of the impact. This is because the required spacing between turbines means that the amount of land excluded from agricultural use is extremely small in relation to the surface area over which a wind farm is distributed.

Wind farm infrastructure (including all associated infrastructure and roads) typically occupies less than 2% of the surface area, according to the typical surface area requirements of wind farms in South Africa (DEA, 2015). Most WEFs, occupy less than 1% of the surface area. All agricultural activities can continue unaffectedly on all parts of the farmland other than this small footprint, from which agriculture is excluded, and the actual loss of production potential is therefore insignificant.

A study done to measure the impact of existing WEFs on agricultural production potential (Lanz, 2018) is highly informative of the extent of the agricultural impact that is likely for this proposed development. Although the study was done in a different agricultural environment, it is similar in terms of being a highly productive and intensively farmed environment with cultivation. There is no reason that the results obtained in that study would not be applicable to the area in this assessment. The overall conclusion of the study was that, although wind farms have been established within an area of cultivated farmland that supports intensive and productive farming, it is highly unlikely that this has caused a reduction in agricultural production. Small amounts of production land have been lost, but the consequence of this for agricultural production has been negligible. It is likely that the positive financial impacts of wind farming have outweighed the negative impacts, and that wind farming has benefited agriculture and agricultural production in the area.

As identified in the study, it is important to note that wind farms have both positive and negative effects on the production potential of land. It is the net sum of these positive and negative effects that determines the extent of the change in future production potential. The positive effects are:

- Increased financial security for farming operations - reliable and predictable income will be generated by the farming enterprises through the lease of land to the energy facility. This will increase financial security and could improve farming operations and productivity through increased investment into farming.

- Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.
- An improved road network, with associated storm water handling system. The WEF will construct turbine access roads of a higher standard than the existing farm roads which will give farming vehicles better access to farmlands. This will be especially relevant during wet periods when access to croplands for spraying etc. is limited by the current farm roads.

The loss of agricultural potential by soil degradation can effectively be prevented for renewable energy developments by generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites. Soil degradation does not therefore pose a significant impact risk.

Due to the facts that the proposed development is predominantly on grazing land, that it will exclude agricultural production from only a very small area of land, and that its negative impact is offset by economic and other benefits to farming, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

The agricultural protocol requires an indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development. As this assessment has shown, the agricultural use of the land will be integrated with the renewable energy facility, and it will continue with no discernible change in terms of production. The expected losses in production and employment will therefore be zero.

There are two additional effects, but because they are highly unlikely to influence agricultural production, they are not considered further. They are:

- Prevention of crop spraying by aircraft over land occupied by turbines – ground based or using drones for spraying are effective, alternative methods that can be used without implications for production or profitability.
- Interference with farming operations - Construction (and decommissioning) activities are likely to have some nuisance impact for farming operations but are highly unlikely to have an impact on agricultural production.

The loss of agricultural potential by soil degradation can effectively be prevented for renewable energy developments by generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites. Soil degradation does not therefore pose a significant impact risk.

10.1.1 CUMULATIVE IMPACT ASSESSMENT

Specialist assessments for environmental authorisation are required to assess cumulative impacts. The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present, or reasonably foreseeable future activities that will affect the same environment.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

What loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present, or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

The DFFE requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

This cumulative impact assessment will determine the quantitative loss of agricultural land if all renewable energy project applications within a 30 km radius become operational. The quantification of the cumulative impact will be done in detail in the EIA phase. This is highly likely to confirm that the cumulative impact of loss of future agricultural production potential is low. The development is highly likely to have an acceptable impact on the agricultural production capability of the area and therefore be recommended for approval from a cumulative agricultural impact point of view.

10.2 NOISE

10.2.1 CONSTRUCTION PHASE

Projected construction noise impacts will only be modelled during the future EIA phase, considering the infrastructure and WTG layout.

Considering the scoping level layout depicted in Figure 4-1, noise levels could exceed 45 dBA₂₂, higher than both the day- and night-time rating levels (during low wind conditions) for a rural noise district at noise sensitive receptors (NSRs).

A potential alignment of access routes was not available during the scoping phase and the potential impact associated with the construction of access roads (a temporary impact), as well as the influence of construction traffic passing NSRs (potentially impact ambient sound levels in the short term), will only be considered during the EIA phase.

10.2.2 OPERATION PHASE

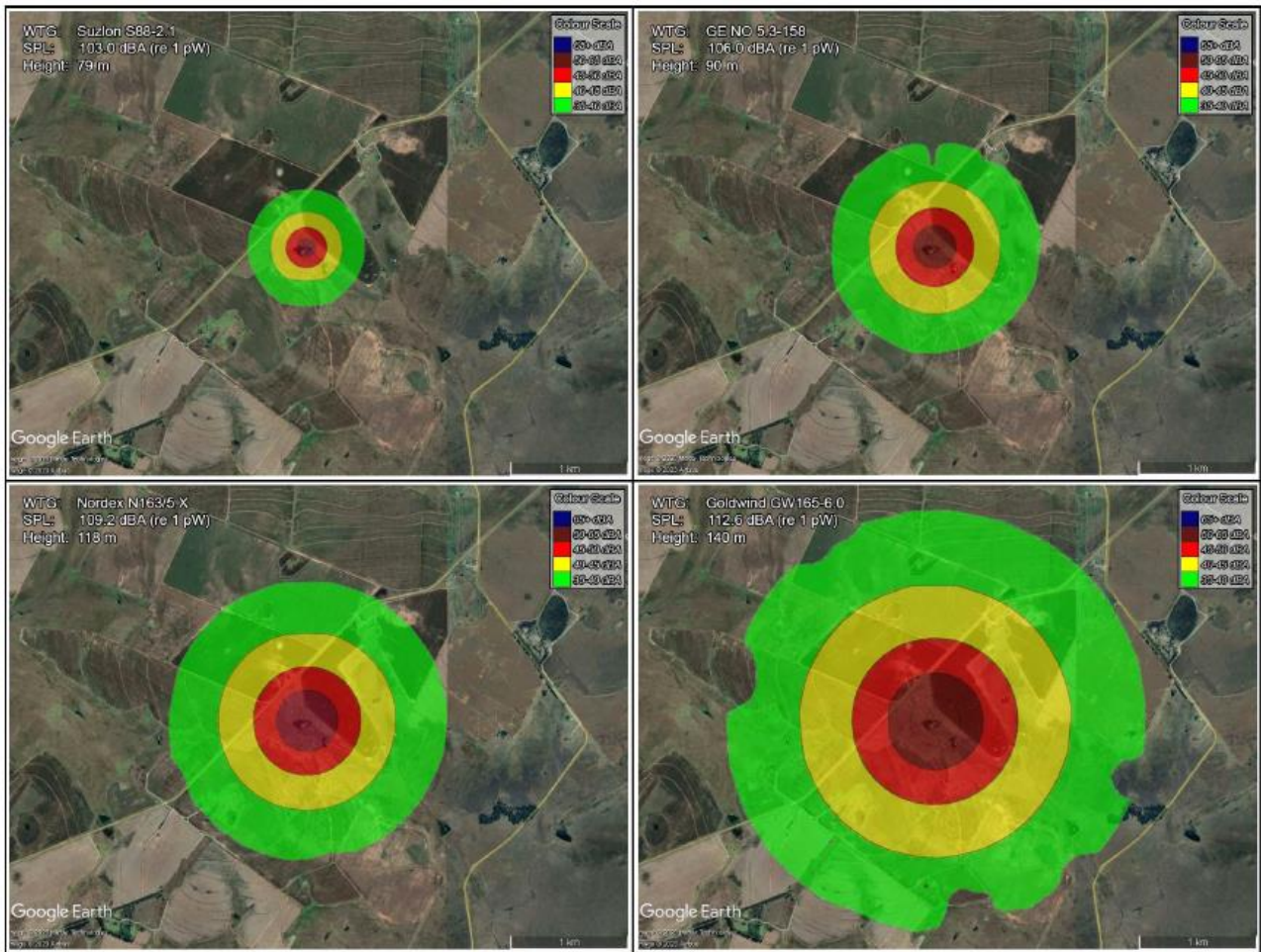
Projected operational noise impacts will only be modelled during the future EIA phase. However, considering the scoping level layout depicted in Figure 4-1, the location of NSRs, as well as noise levels associated with a potential worst-case WTG, noises could change existing ambient sound levels. The noises from operating WTG will be clearly audible and the noise level could annoy NSRs.

The equivalent noise level could be higher than 45 dBA at distances closer than 500m from NSR (using the sound power emission level of 112.6 dBA re 1 pW), though the basic model does not consider the potential cumulative effects, the impact of atmospheric absorption, ground surface or topography. This noise level is higher than the proposed desired night-time rating level. The potential extent of noise from different WTG are also illustrated in Figure 10-1.

This however will be considered in more detail during the EIA phase, using the WTG layout, as well as the SPL of a viable WTG, using an internationally recognized noise propagation model.

Such a noise propagation model can also consider cumulative noise impacts, as well as factors such as air absorption, character of the noise, surface factors and topography.

FIGURE 10-1: EXTENT OF NOISES FROM DIFFERENT WIND TURBINES (UNMITIGATED, WORST-CASE PARAMETERS)



10.3 FRESHWATER AND WETLAND (AQUATICS)

During this phase of the investigation, it was found that the greatest number of impacts could occur within the construction phase, however the High sensitivity / No-Go areas can be avoided, thus the impacts would be limited to the aquatic environment.

Regarding the decommissioning phase, these impacts would be the same as those in the construction phase, but again limited as all sensitive aquatic habitats were avoided.

Potential aquatic ecosystems impacts anticipate include:

- Impact 1: Loss of habitat containing protected species or Species of Special Concern
- Impact 2: Loss of any critical corridors, important catchment areas and connected habitats that are linked to any future conservation plans or protected areas expansion associated within any riverine or wetland systems
- Impact 3: The potential spread of alien vegetation
- Impact 4: Loss of riparian and or wetland habitat
- Impact 5: Changes to the hydrological regime and increased potential for erosion
- Impact 6: Changes to water quality

- Impact 7: Cumulative Impacts

10.4 TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)

10.4.1 FAUNA

10.4.1.1 CONSTRUCTION PHASE

Impacts associated with direct habitat loss include:

- Vegetation clearing: The construction of roads, turbine hard-stands, roads, laydown areas and site offices will result in the removal of currently intact vegetation
- Fire Frequency: Artificially altered fire regimes may reduce habitat suitability by changing vegetative communities and habitat structure.

Impacts associated with indirect habitat loss include:

- Reduced Connectivity and restricted movement: Construction activities and novel infrastructure (e.g., perimeter fencing) may exclude species from portions of suitable habitat by restricting animals' movement across the landscape
- Altered Flow Regimes: Construction of infrastructure may alter water flow characteristics such as runoff, sedimentation and infiltration. These could change vegetation community composition, soil depth and habitat suitability.
- Overgrazing: Construction areas becoming unavailable for grazing may alter grazing patterns, potentially concentrating livestock in areas of high habitat suitability for various SCCs
- Disturbance / Displacement: Increase in construction activity, movement of machinery and operation of equipment may disturb and/ or displace certain animal SCCs from the vicinity of construction

Impacts associated with direct mortality include:

- Increased Traffic and Roadkill: Increased frequency of vehicle movement associated with construction activity increases the possibility of vehicles colliding with animals resulting in roadkill fatalities
- Illegal collecting, poaching and/ or entrapment with infrastructure: Increased access to the site from construction activities could increase the possibility of illegal collection of animals and increased poaching opportunities. Animals may also become entangled or entrapped in temporary fencing or excavations

Impacts associated with indirect mortality include:

- Increased predator presence: Construction camps can attract species such as crows, which depredate on various animals such as tortoises and juvenile rabbits

Decreased predator detection: Increased noise from construction activities may mask natural sounds and reduce the ability for animals to detect the presence of predators

10.4.1.2 OPERATION PHASE

Impacts associated with direct habitat loss include:

- Fire Frequency: Artificially altered fire regimes may reduce habitat suitability by changing vegetative communities and habitat structure

Impacts associated with indirect habitat loss include:

- Reduced Connectivity and restricted movement: Novel infrastructure (e.g., perimeter fencing) may exclude species from portions of suitable habitat by restricting animals' movement across the landscape
- Altered Flow Regimes: Novel infrastructure may alter water flow characteristics such as runoff, sedimentation and infiltration. These could change vegetation community composition, soil depth and habitat suitability
- Overgrazing: Infrastructure areas becoming unavailable for grazing may alter grazing patterns, potentially concentrating livestock in areas of high habitat suitability for various SCCs
- Disturbance / Displacement: Operational activities may disturb and/ or displace certain animal SCCs from the vicinity of infrastructure

Impacts associated with direct mortality include:

- Increased Traffic and Roadkill: Increased frequency of vehicle movement associated with operational activity increases the possibility of vehicles colliding with animals resulting in roadkill fatalities
- Entrapment with infrastructure: Animals may become entangled or entrapped in fencing or cattle grids

Impacts associated with indirect mortality include:

- Increased predator presence: Operational activities can attract species such as crows, which depredate on various animals such as tortoises and juvenile rabbits. Associated infrastructure such as transmission pylons may provide perching or nesting platforms for predatory species such as Martial Eagle and/ or Jackal Buzzard which prey on various animal SCCs
- Decreased predator detection: Increased noise from wind turbine generators and operational activities may mask natural sounds and reduce the ability for animals to detect the presence of predators

10.4.1.3 DECOMMISSIONING PHASE

Anticipated impacts of the decommission phase are expected to mirror those of the construction phase.

10.4.1.4 CUMULATIVE IMPACTS

Four (4) renewable energy developments have been approved within 30 km of the proposed development area, all of which being solar photovoltaic (PV) developments. The existing 44 MW Touwsrivier CPV Solar Project is situated on 190 ha to the northeast of the proposed WEF development. Solar PV developments generally require the clearance of large areas for the solar arrays, particularly in flatter low-lying areas utilized by species such as Riverine Rabbit. In contrast, the proposed WEF development is largely focused on elevated hilltops, allowing for a reduced impact on low-lying habitats. Current land-use practices across the site, such as agricultural ploughing and fruit production plantations, represent a significant threat to

remaining areas of natural or near-natural habitat and animal SCCs as these activities necessitate the modification of large areas of land. The impact significance of existing agriculture could potentially be reduced through restoration programmes.

10.4.2 FLORA

10.4.2.1 CONSTRUCTION PHASE

- Vegetation Clearing – Predominantly during the Construction Phase and possibly during the Decommission Phase certain areas will need to be cleared of vegetation to facilitate construction and/or deconstruction, and transport of personnel on site.
- Chemical contamination – Spillage of construction materials or chemicals can adversely impact plants and waterbodies on which they depend.

It should be noted however that these impacts are likely to occur in varying degrees during all phases.

10.4.2.2 OPERATION PHASE

- Loss of individual SCC – Associated with the impact of vegetation clearing, but also due to potential greater ease of access during the Operational Phase might put SCC at greater risk of targeted illegal poaching and harvesting.
- Alien invasive species – Movement of personnel during all phases, and increased disturbance put the proposed study area at greater risk of alien invasive species moving into and spreading within the proposed study area.
- Soil erosion – Facilitated by clearing vegetation and increased road use during all phases which promote soil displacement and loss.
- Fire risk – Due to smoking and/or uses electrical equipment on site.

10.4.2.3 DECOMMISSIONING PHASE

The impacts that will be most prevalent during the Decommission Phase of the proposed Khoe WEF are vegetation clearing and Loss of individual SCC.

10.4.2.4 CUMULATIVE IMPACTS

- Broad-scale ecological processes – Ecological corridors for the dispersal and movement of plant across the landscape could be compromised.
- Conservation objectives – Local, national and international conservation efforts and areas in the area could be impacted.

10.5 AVIFAUNA

According to a position paper on the subject by Birdlife SA (<http://www.birdlife.org.za/conservation/terrestrial-bird-conservation/birds-and-renewable-energy>) the main avian wind farm impacts are:

- Collision with the turbine blades or associated infrastructure;
- Displacement of nationally important species from their habitats;
- Loss of habitat for such species; and
- Disturbance during construction and the operation of the facility.

Long-term analyses of the effect of WEFs on birds originate from studies from the United Kingdom, the USA, and Spain (www.nrel.gov, Kingsley & Whittam 2005, Drewitt & Langston 2006, Kuvlevsky et al. 2007, Stewart et al. 2007, Drewitt & Langston 2008, Loss et al. 2013).

Studies from South Africa are now beginning to appear, and add an African perspective to the data sets (Ralston-Paton et al. 2017, Simmons and Martins 2018, Perold et al. 2020).

With a few exceptions most studies suggest low numbers of bird fatalities at WEFs numbering tens to hundreds of birds per year (Kingsley & Whittam 2005). The observed mortality caused by wind farms is also generally low compared to other existing sources of anthropogenic avian mortality (Crockford 1992, Colson & associates 1995, Gill et al. 1996, and Erickson et al. 2001, Sovacool 2009, 2013). As an example, population declines due to climate change and fossil fuels is estimated at 14.5 million bird deaths annually, whereas WEFs kill about 234,000 birds annually in the USA (Sovacool 2013).

In South Africa, with 32 operational wind farms at the end of 2022, and an average of 36.8 turbines per wind farm, at an average fatality rate of 4.6 birds/turbine/year (Perold et al. 2020), the projected mortality is about 5,420 birds annually.

10.5.1 CONSTRUCTION PHASE:

Displacement of nationally important species from their habitats is anticipated during the construction of the proposed development. No direct fatalities are anticipated during this phase of the project.

10.5.2 OPERATIONAL PHASE

Operational Phase impacts include;

- Fatalities of priority species, due to collision with turbines (common with collision-prone species)
- Displacement of priority species for the duration of the operational phase
- Power Line Collisions, particularly with Red Data bustards and cranes

10.5.3 CUMULATIVE IMPACTS

Cumulative impacts are defined as "impacts that result from incremental changes caused by either past, present, or reasonably foreseeable actions together with the project" (Hyder, 1999, in Masden et al. 2010).

In this context, cumulative impacts are:

- Those that will impact the general avian communities in and around the Khoe WEF, mainly by other renewable energy farms; and
- Associated infrastructure in the form of power lines in Nama Karoo surrounds.

The focus here is on fatalities through collisions, associated with renewable energy developments, as they are easier to quantify than displacement effects and likely to be of higher magnitude. All renewable energy developments within a 30-km radius of the site need to be determined and, secondly, their impact on avifauna estimated.

Given the general assumption that footprint size and bird impacts are linearly related for wind and solar farms, a starting point in determining cumulative impacts is to calculate:

- The number of birds displaced per unit area, by habitat destruction, or disturbed or displaced by humans;
- The number of birds killed by collision with the wind and solar facility nearby; and
- The number of birds killed by collision with infrastructure (e.g., power lines, fences) within, or leading from, the site.

According to the DFFE webpage (https://egis.environment.gov.za/data_egis/data_download/current_2022), only one renewable energy development is currently on record with the DFFE within 30-km of Khoe WEF. Several others are proposed (one wind farm and one solar farm) but have yet to be registered. The combined energy output of the one "approved" projects is 200 MW from another wind farm.

10.6 BATS

Bats are long-lived mammals and females often produce only one pup per year, resulting in a life strategy characterized by slow reproduction (Barclay and Harder, 2003). Because of this, bat populations are sensitive to changes in mortality rates and their populations tend to recover slowly from declines.

The potential impacts on bats could be summarised as follow:

- Removal of limited roosting space on-site, such as rock formations or trees;
- Mortality during the operation of wind turbines;
- Habitat loss due to the operational wind farm;
- Change in foraging potential;
- Create new bat conducive habitat amongst the turbines; and
- The cumulative effect of the above together with the surrounding wind farms.

The ideal, when managing the impact of WEFs on bats throughout the project's lifespan, is to maintain bat populations as they occur on-site and avoid attracting more bats to the area of potential collision.

The potential impacts identified at this stage of the bat monitoring include:

10.6.1 CONSTRUCTION PHASE

- Roost disturbance, destruction and fragmentation due to construction activities;
- Creating new habitats amongst the turbines, such as buildings, excavations, or quarries; and
- Disturbance to bats during the construction activities during night-time.

10.6.2 OPERATIONAL PHASE

- Mortality due to direct collision or barotrauma of resident bats;
- Mortality due to direct collision or barotrauma of migrating bats;
- Loss of bats of conservation value;
- The attraction of bats to wind turbines;
- Loss of habitat and foraging space; and
- Reduction in the size, genetic diversity, resilience, and persistence of bat populations.

10.6.3 DECOMMISSIONING PHASE

- Disturbance due to decommissioning activities

10.6.4 CUMULATIVE IMPACTS

- Cumulative effect of construction activities of several wind farms within 30 km from the proposed Khoe WEF site;
- Cumulative resident bat mortality of all the wind farms;
- Cumulative bat mortality of migrating bats;
- Cumulative loss of bats of conservation value;
- Cumulative effect of habitat loss over several thousand hectares of all wind farms; and
- Cumulative reduction in the size, genetic diversity, resilience, and persistence of bat populations

10.7 SOCIO-ECONOMIC

10.7.1 CONSTRUCTION PHASE

10.7.1.1 CREATION OF LOCAL EMPLOYMENT, TRAINING, AND BUSINESS OPPORTUNITIES

The construction phase will extend over a period of approximately 18-24 months and create in the region of 200-250 employment opportunities that will benefit members from the local communities in the area, including Montagu, De Doorns and Touws River. These opportunities will include opportunities for low, semi and highly workers. Most of the employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. A percentage of the wage bill will be spent in the local economy, which will also create opportunities for local businesses in the local towns in the area. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. Based on information from similar projects the total wage bill will be in the region of R 25 million (2023 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

The capital expenditure will be approximately R 6 billion (2023 Rand value) and will create opportunities for local businesses. However, given the technical nature of the development most benefits are likely to accrue to companies based in the Cape Metro. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

The potential benefits for local communities are confirmed by the findings of the Overview of the IPPPP undertaken by the Department of Energy, National Treasury and DBSA (June 2020). The study found that to date, a total of 52,603 job years have been created for South African citizens, of which 42,355 job years were in construction and 10,248 in operations. To date, 42,355 job years for SA citizens were achieved during construction, which is 26% above the planned 33,707

job years for active projects. These job years are expected to rise further since 23 REIPPPP bid window 4 (BW4) projects are still in or entering, construction.

In terms of benefits for local communities, significantly more people from local communities were employed during construction than was initially planned. For active projects, the expectation for local community participation was 13,284 job years. To date 22,935 job years have been realised (i.e. 73% more than initially planned), with 23 projects still in, or entering, construction. The number of black SA citizens employed during construction also exceeded the planned numbers by 53%.

Black South African citizens, youths and rural or local communities have been the major beneficiaries during the construction phases, as they respectively represent 81%, 43% and 49% of total job opportunities created by IPPs to date. However, woman and disabled people could still be significantly empowered as they represent a mere 10% and 0.4% of total jobs created to date, respectively. Nonetheless, the fact that the REIPPPP has raised employment opportunities for black South African citizens and local communities beyond planned targets, indicates the importance of the programme to employment equity and the drive towards more equal societies.

The share of black citizens employed during construction (81%) and the early stages of operations (84%) has significantly exceeded the 50% target and the 30% minimum threshold. Likewise, the share of skilled black citizens (as a percentage of skilled employees) for both construction (69%) and operations (80%) has also exceeded the 30% target and minimum threshold of 18%. The share of local community members as a share of SA-based employees was 49% and 68% for construction and operations respectively – exceeding the minimum threshold of 12% and the target of 20%.

10.7.1.2 IMPACT OF CONSTRUCTION WORKERS ON LOCAL COMMUNITIES

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. While it is possible to reduce the risks associated with construction workers it is not possible to totally avoid the potential impacts.

10.7.1.3 INFLUX OF JOB SEEKERS

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of several renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 10.7.1.2. However, given the location of the project and relatively short duration of the construction phase the potential for economically motivated in-migration and subsequent labour stranding is likely to be negligible. The risks associated with the influx of job seekers are therefore likely to be low.

10.7.1.4 RISK TO SAFETY, LIVESTOCK, AND FARM INFRASTRUCTURE

The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase.

10.7.1.5 NUISANCE IMPACTS ASSOCIATED WITH CONSTRUCTION RELATED ACTIVITIES

The construction activities on site and movement of heavy construction vehicles during the construction phase has the potential to create noise and dust impacts, damage local roads and create safety impacts for other road users. Based on the findings of the Socio-economic scoping report the potential dust and noise impacts associated with the construction phase are likely to be limited. The traffic related impacts associated with the transport of materials to the site can also be effectively managed if the required mitigation measures are implemented.

10.7.1.6 INCREASED RISK OF GRASS FIRES

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The area is susceptible to grass fires during the summer months (October-May).

10.7.1.7 IMPACTS ASSOCIATED WITH LOSS OF FARMLAND

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for crops

and grazing. However, experience from other WEFs is that impact on farming operations can be effectively minimised and mitigated by careful planning in the final layout of the proposed WEF and associated components. The impact on farmland associated with the construction phase can also be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Recommended mitigation measures are outlined below.

The timing / phasing on construction activities should where possible also be planned to avoid and or minimise disruption to farming operations. Affected landowners should be involved in planning of timing of construction activities.

10.7.2 OPERATIONAL PHASE

10.7.2.1 IMPROVE ENERGY SECURITY AND SUPPORT THE RENEWABLE ENERGY SECTOR

The primary goal of the proposed project is to improve energy security in South Africa by generating additional energy. The proposed WEF also reduces the carbon footprint associated with energy generation. The project should therefore be viewed within the context of the South Africa's current reliance on coal powered energy to meet most of its energy needs, and secondly, within the context of the success of the REIPPPP.

10.7.2.2 CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES

The proposed development will create ~ 20 full-time employment opportunities during the operational phase. Based on similar projects the annual operating budget will be in the region of R 24 million (2023 Rand values), including wages.

10.7.2.3 GENERATE INCOME FOR AFFECTED LANDOWNERS

The proponent will be required to either purchase the land or enter into a rental agreement with the affected landowners for the use of the land for the establishment of the proposed WEF. Farming operations are impacted by droughts and market fluctuations. Any additional source of income therefore represents a benefit for the affected landowner(s). The additional income would assist to reduce the risks to their livelihoods posed by droughts and fluctuating market prices for outputs and farming inputs, such as fuel, feed etc. The additional income would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy.

10.7.2.4 BENEFITS ASSOCIATED WITH THE SOCIO-ECONOMIC DEVELOPMENT CONTRIBUTIONS

The REIPPPP has been designed not only to procure energy, but has also been structured to contribute to the broader national development objectives of job creation, social upliftment and broadening of economic ownership. Socio-economic development (SED) contributions are an important focus of the REIPPPP and are aimed at ensuring that local communities benefit directly from the investments attracted into the area. These contributions are linked to Community Trusts and accrue over the project operation life and, in so doing, create an opportunity to generate a steady revenue stream over an extended period. This revenue can be used to fund development initiatives in the area and support the local community. The long-term duration of the revenue stream also allows local municipalities and communities to undertake long term planning for the area. The revenue from the proposed WEF can be used to support several social and economic initiatives in the area, including:

- Creation of jobs.
- Education.
- Support for and provision of basic services.
- School feeding schemes.
- Training and skills development.
- Support for SMME's.

The minimum compliance threshold for SED contributions is 1% of the revenue with 1.5% the targeted level over the 20-year project operational life. For the current portfolio of projects, the average commitment level is 2.2%, which is 125% higher than the minimum threshold level. To date (across seven bid windows) a total contribution of R23.1 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.2 billion. Of the total commitment, R18.8 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

SED contributions do therefore create opportunities for local rural communities. However, SED contributions can also be mismanaged. This is an issue that will need to be addressed when managing SED investments.

10.7.2.5 POTENTIAL IMPACT ON PROPERTY VALUES

A literature review was undertaken as part of the Socio-economic scoping report. It should be noted that the review does not constitute a property evaluation study and merely seeks to comment on the potential impact of wind farms on property values based on the findings of studies undertaken overseas. The assessment rating is based on the findings of the review. In total five articles were identified and reviewed namely:

- Stephen Gibbons (April 2014): Gone with the wind: Valuing the Visual Impacts of Wind turbines through house prices. London School of Economics and Political Sciences & Spatial Economics Research Centre, SERC Discussion Paper 159.
- Review of the Impact of Wind Farms on Property Values, Urbis Pty Ltd (2016): Commissioned by the Office of Environment and Heritage, NSW, Australia.
- Yasin Sunak and Reinhard Madlener (May 2012): The Impact of Wind Farms on Property Values: A Geographically Weighted Hedonic Pricing. School of Business and Economics / E.ON Energy Research Center, RWTH Aachen University. Model Working Paper No. 3/2012.
- Martin D. Heintzelman and Carrie M. Tuttle (March 3, 2011): Values in the Wind: A Hedonic Analysis of Wind Power Facilities. Economics and Financial Studies School of Business, Clarkson University.
- Ben Hoen, Jason P. Brown, Thomas Jackson, Ryan Wiser, Mark Thayer and Peter Cappers (August 2013): A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Ernest Orlando Lawrence Berkeley National Laboratory.

Based on the findings of the literature review the potential impact of WEFs on rural property values is likely to be low, specifically for farms that are farmed as productive farms. However, there are several nature reserves and tourist facilities in the area. The attraction of these areas is likely to be linked to the rural character of the area, including the views and vistas. The potential for the proposed WEF to visually impact on a number of these facilities therefore exists.

The potential impact on property values will need to be assessed during the Assessment Phase. The potential visual impact on the area's sense place will be informed by the findings of the VIA.

10.7.2.6 POTENTIAL IMPACT ON TOURISM

A review of international literature in the impact of wind farms was undertaken as part of the Socio-economic scoping report. Three articles were reviewed, namely:

- Atchison, (April 2012). Tourism Impact of Wind Farms: Submitted to Renewables Inquiry Scottish Government. University of Edinburgh.
- Glasgow Caledonian University (2008). The economic impacts of wind farms on Scottish tourism. A report prepared for the Scottish Government.
- Regeneris Consulting (2014). Study into the Potential Economic Impact of Wind Farms and Associated Grid Infrastructure on the Welsh Tourism Sector.

Based on the findings of the review there is limited evidence to suggest that WEFs impact on tourism. However, as indicated above, there are several nature reserves and tourist facilities in the area. The attraction of these areas is likely to be linked to the rural character of the area, including the views and vistas. The potential for the proposed WEF to visually impact on a number of these facilities therefore exists. The potential impact on these operations will need to be assessed during the Assessment Phase. The potential visual impact on the area's sense place will be informed by the findings of the VIA.

10.7.3 DECOMMISSIONING PHASE

Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. However, in the case of the proposed facility the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern technology. This is likely to take place in the 20 - 25 years post commissioning. The decommissioning phase is therefore likely to create additional construction type jobs, as opposed to the jobs losses typically associated with decommissioning. The number of people employed during the operational phase will be in the region of up to 20. Given the low number of people employed during the operational phase the decommissioning of the facility will not have a significant negative social impact on the local community. The potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme.

The decommissioning phase will also create employment opportunities. This will represent a positive impact. These jobs will, however, be temporary.

10.7.4 CUMULATIVE IMPACT ASSESSMENT

Specialist assessments for EA are required to assess cumulative impacts. The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present, or reasonably foreseeable future activities that will affect the same environment.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the

development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

10.7.4.1 CUMULATIVE AGRICULTURAL IMPACTS

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

- What loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present, or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

The DFFE requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

This cumulative impact assessment will determine the quantitative loss of agricultural land if all renewable energy project applications within a 30 km radius become operational. The quantification of the cumulative impact will be done in detail in the EIA phase. This is highly likely to confirm that the cumulative impact of loss of future agricultural production potential is low. The development is highly likely to have an acceptable impact on the agricultural production capability of the area and therefore be recommended for approval from a cumulative agricultural impact point of view.

10.7.4.2 CUMULATIVE IMPACT ON LOCAL SERVICES AND ACCOMMODATION

The objective will be to source as many low and semi-skilled workers for the construction phase are from the Local Municipalities. This will reduce the pressure on local services and accommodation in the area. For a single WEF project ~ 200-250 workers may require accommodation. In the event of the construction phase for 2 projects overlapping, the total number of workers requiring accommodation would be between 400 and 500. The potential pressure on local services will depend on the number of locally based contractors and workers that are employed during the construction phase.

The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the area. These benefits will create opportunities for investment in the area, including the opportunity to upgrade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. The proposed WEF is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED. This will provide revenue that can be used by the Langeberg Local Municipality to invest in upgrading local services where required. It should also be noted that it is the function of national, provincial, and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment

of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the Langeberg Local Municipality.

10.7.4.3 CUMULATIVE IMPACT ON LOCAL ECONOMY

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEFs, will also create several socio-economic opportunities for the Local Municipalities. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities. The potential cumulative benefits are associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

10.8 HERITAGE AND PALAEOLOGY

10.8.1 CONSTRUCTION PHASE

10.8.1.1 PALAEOLOGY

Paleontological resources may be affected by earthworks and excavation during the construction of the Khoe WEF.

However, the potential for fossils within the Table Mountain and Bokkeveld Groups bedrock and the younger, overlying soils that mantle much the area is very variable and is negatively affected by the folding and tectonic deformation of these formations within the Cape Fold Belt mountains. The significance of impacts paleontological resources will thus be low negative, but very low negative with the implementation of mitigation measures.

10.8.1.2 ARCHAEOLOGY

Archaeological sites and materials may be affected by earthworks and excavation during the construction of the WEF. At present very little archaeological material has been identified in the region and none within the wind energy project footprint.

The archaeology recorded by previous archaeological assessments in the vicinity of the Khoe WEF is generally of low significance, and the significance of impacts on such material, should it occur within the WEF area, would thus be low negative without the implementation of mitigation measures, and very low following mitigation.

10.8.1.3 GRAVES OR BURIALS

Human graves or burials could be impacted almost anywhere on the site, but the probability of this happening during activities associated with the construction and decommissioning of the Khoe WEF is extremely low and the significance rating is thus very low negative both without and with the implementation of mitigation measures.

10.8.1.4 CULTURAL LANDSCAPE

The cultural landscape is likely to be the heritage resource most affected by the construction of the WEF. The introduction of the large infrastructural elements associated with a WEF into a generally rural landscape with identified scenic value has the potential to have a high negative

impact on the cultural landscape. This may be reduced to medium negative if suitable measures to mitigate the intrusion of the WEF into the landscape can be implemented.

10.8.2 OPERATIONAL PHASE

The only likely impact during the operational phase of the project will be to the landscape and the rating given above for the development phase remains applicable: high negative but reduced to medium negative if suitable measures to mitigate the intrusion of the WEF into the landscape have been implemented.

10.8.3 DECOMMISSIONING PHASE

The only likely impact during the decommissioning of the project will be to the landscape, but if decommissioning results in the removal of the WEF infrastructure, this impact is likely to be positive.

10.8.4 CUMULATIVE IMPACTS

The consideration and assessment of cumulative impacts is based on the list of approved Wind and Solar PV projects in the Renewable Energy EIA Application (REEA) Database (2022_Q2) located within 30 km of the Khoe WEF. Two approved projects are located north-east of the Khoe WEF – the Montague Road and Touwsriver SEFs – and the proposed Ezelsjacht WEF lies directly north of the Khoe site.

Cumulative impacts to paleontological material are difficult to assess because of the very variable distribution of fossils within the underlying bedrock of the region. Much of the region around the Khoe WEF is indicated as high or very high sensitivity on the SAHRA palaeo-map, and where impacts do occur, they can thus be expected to be significant. However, the patchy nature of the paleontological resource means that the risk of impacts are reduced, and with mitigation, a low (negative) cumulative impact significance can be expected.

As with paleontology, cumulative impacts to archaeological sites and/or materials and graves are difficult to assess, again because of the variable distribution of sites and materials across the landscape and because of the differences in the quality of surveys and reporting on different projects. Field observations made in previous assessments in the vicinity of the Khoe WEF suggest that significant archaeological sites and materials are not common in the area and that, provided appropriate mitigation measures are implemented, a low (negative) cumulative impact significance can be expected.

Impacts to the cultural landscape could be extensive if many projects are constructed in the vicinity, particularly if these projects are highly visible. These cumulative impacts cannot be fully mitigated but the implementation of the recommendations of visual consultants across all projects would likely reduce impacts from high to medium negative if highly sensitive areas are avoided.

Impacts to the landscape are the main driver of cumulative impacts on heritage resources.

10.9 VISUAL/ LANDSCAPE

Anticipated issues related to the potential visual impact of the proposed Khoe WEF include the following:

- The visibility of the facility to, and potential visual impact on residents of dwellings within the study area, with specific reference to the residents in closer proximity to the proposed development.
 - The visibility of the operational facility and ancillary infrastructure to, and potential visual impact on observers within the region.
 - The visibility of the facility and ancillary infrastructure to, and potential visual impact on observers travelling along the main roads, as well as secondary roads within the study area.
- The potential visual impact of the facility on the visual character or sense of place of the region.
- The potential visual impact of the construction of ancillary infrastructure (i.e., internal access roads, buildings, power line, etc.) on observers near the facility.
- The potential visual impact of the facility on tourist routes/tourist destinations and protected areas (if present).
- The visual absorption capacity of the natural vegetation (if applicable).
 - The potential cumulative visual impacts of the facility and ancillary infrastructure within the study area.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in proximity of the facility.
 - The potential visual impacts of shadow flicker on sensitive and potentially sensitive visual receptors in close proximity.
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local and/or regional scale.

10.10 TRAFFIC

10.10.1 DETERIORATION OF ROAD NETWORK CONDITIONS

Heavy vehicle traffic during both construction and decommissioning phase of the development are expected to cause additional wear and tear on the surrounding road network. Internal project gravel roads to individual turbine sites are also expected to sustain damage during the construction and decommissioning phase of the project (i.e., surface distress - gravel loss leading to damage to the existing gravel road layers and rutting).

10.10.2 IMPACT OF DUST ALONG GRAVEL ACCESS ROADS

Heavy vehicles are expected to cause dust along unpaved access roads to the site during the transportation of various components to the site leading to possible loss of visibility from a safety point of view, health, damage to roadside vegetation and environmental impact such as air pollution.

10.10.3 IMPACT OF ADDITIONAL TRAFFIC VOLUMES ON ROAD SECTIONS, INTERSECTION CAPACITY AND TRAFFIC SAFETY

The project will inevitably result in the disruption of traffic on Local, Regional, and National Routes but to some varying degrees. The severity of the impacts will depend on the order of the road (how many lanes, width, length, turns, etc.), the receiving environment and vicinity of land uses and towns. Additional traffic on the road network could result in changes to the operations of that road network. Additionally, the severity of the impacts will depend on the expected traffic volumes to be generated by the proposed development. A full traffic impact study will be required to estimate the volume of traffic associated with the transportation of personnel and materials/components to site during the construction and operational phases. The standards, manuals, and guideline documents to be used are as follows (as applicable):

- Technical Methods for Highways (TMH) 16: Volume 1 and Volume 2 - South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual; and
- Technical Recommendations for Highways (TRH) 26 South African Road Classification and Access Management Manual (Version 1.0 August 2012).

10.10.4 IMPACT OF ABNORMAL LOADS

The project will inevitably result in the movement of abnormal loads on Local, Regional and National Routes, but to varying degrees. The severity of the impacts will depend on the travelling speed, vehicle size and loaded height of the abnormal vehicles expected. Thus, additional abnormal traffic on the road network could result in changes to the operational performance/level of service of that road network. The standards, manuals, and guideline documents to be used are as follows (as applicable):

- The National Road Traffic Regulations (1999) promulgated under Section 75 of the National Road Traffic Act (Act No. 93 of 1996) regulate the conveyance of abnormal loads and dangerous goods on public roads; and
- TRH 11 Dimensional and Mass Limitations and Other Requirements for Abnormal Load Vehicles.

10.10.5 CUMULATIVE IMPACTS

The addition of other WEFs in the area is expected to increase the overall impact due to increased construction-related activities. However, some impacts will be unavoidable but can remain within acceptance tolerances. The overall impacts are expected to be of moderate negative significance post mitigation through appropriate measures.

- Road damage - Additional wear and tear on the surrounding road network caused by development heavy vehicles. Gravel roads to various sites are also expected to sustain damage during the construction and decommissioning phase of the project (i.e., surface distress - gravel loss leading to damage to the existing gravel road layers and rutting).
- Heavy vehicles are expected to cause dust along unpaved access roads to the site during the transportation of various components to the site leading to possible loss of visibility from a safety point of view, health, damage to roadside vegetation and environmental impact such as air pollution.
- Disruption of traffic on Local, Regional, and National Routes due to additional peak hour traffic volumes associated with the transportation of personnel and materials/components to

site during the construction. Additional traffic on the road network could result in changes to the normal operations of that road network.

- The project will inevitably result in the movement of abnormal loads on Local, Regional and National Routes, but to varying degrees. The severity of the impacts will depend on the travelling speed, vehicle size and loaded height of the abnormal vehicles expected. Thus, additional abnormal traffic on the road network could result in changes to the operational performance/level of service of that road network.

11. SUMMARY OF PRELIMINARY FINDINGS & CONCLUSION

11.1 SOIL AND AGRICULTURAL POTENTIAL

The overall conclusion of this assessment is that the proposed development offers a valuable opportunity for integrating renewable energy with agricultural production in a way that provides benefits to agriculture, and which leads to minimal loss of future agricultural production potential.

The site is classified as ranging from low to high agricultural sensitivity by the screening tool. This site sensitivity verification verifies those parts of the site that are indicated as cropland in this assessment as being of high agricultural sensitivity, and the rest of the site as being of low to medium agricultural sensitivity.

Given that the proposed development is predominantly on grazing land, that it will exclude agricultural production from only a very small area of land, and that its negative impact is offset by economic and other benefits to farming, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed here as being of low significance and as acceptable.

Its acceptability is further substantiated by the following points:

- The proposed development will also have the wider societal benefits of generating additional income and employment in the local economy.
- In addition, the proposed development will contribute to the country's urgent need for energy generation, particularly renewable energy that has much lower environmental and agricultural impact than existing, coal powered energy generation.
- All renewable energy development in South Africa decreases the need for coal power and thereby contributes to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land throughout the coal mining areas of the country. Furthermore, a reduction in coal power saves water resources and therefore potentially makes more water available for irrigated agriculture.

From an agricultural impact point of view, it is recommended that the proposed development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

11.2 NOISE

11.2.1 OUTCOME OF SITE SENSITIVITY VERIFICATION

Areas with a "Very High" Sensitivity to noise are indicated on Figure 4-1. The online screening tool identified several areas with a "very high" sensitivity to noise in the vicinity of the proposed development.

There are permanent or temporary residential activities at the locations marked with green symbols and these are located within 2,000m from the area where wind turbines may be developed. These residential activities are considered to be noise-sensitive, and the areas are considered to have a "Very High" sensitivity to noise.

There are also numerous other areas that are not associated with potential residential or other noise-sensitive activities. This assessment therefore disputes that these areas have a "very high" sensitivity to noise.

Due the presence of potential noise sensitive activities, the potential impact from noise should be assessed in a future Noise Specialist Study.

11.2.2 POTENTIAL NOISE SENSITIVE RECEPTORS

Figure 11-1 illustrates generalized 500 m buffers around identified NSR structures . FIGURE 1-2 also illustrates the preliminary WTG layout considered for in this report for scoping purposes. While preliminary, it is recommended that the proponent not locate WTG within 500 m from these NSR locations.

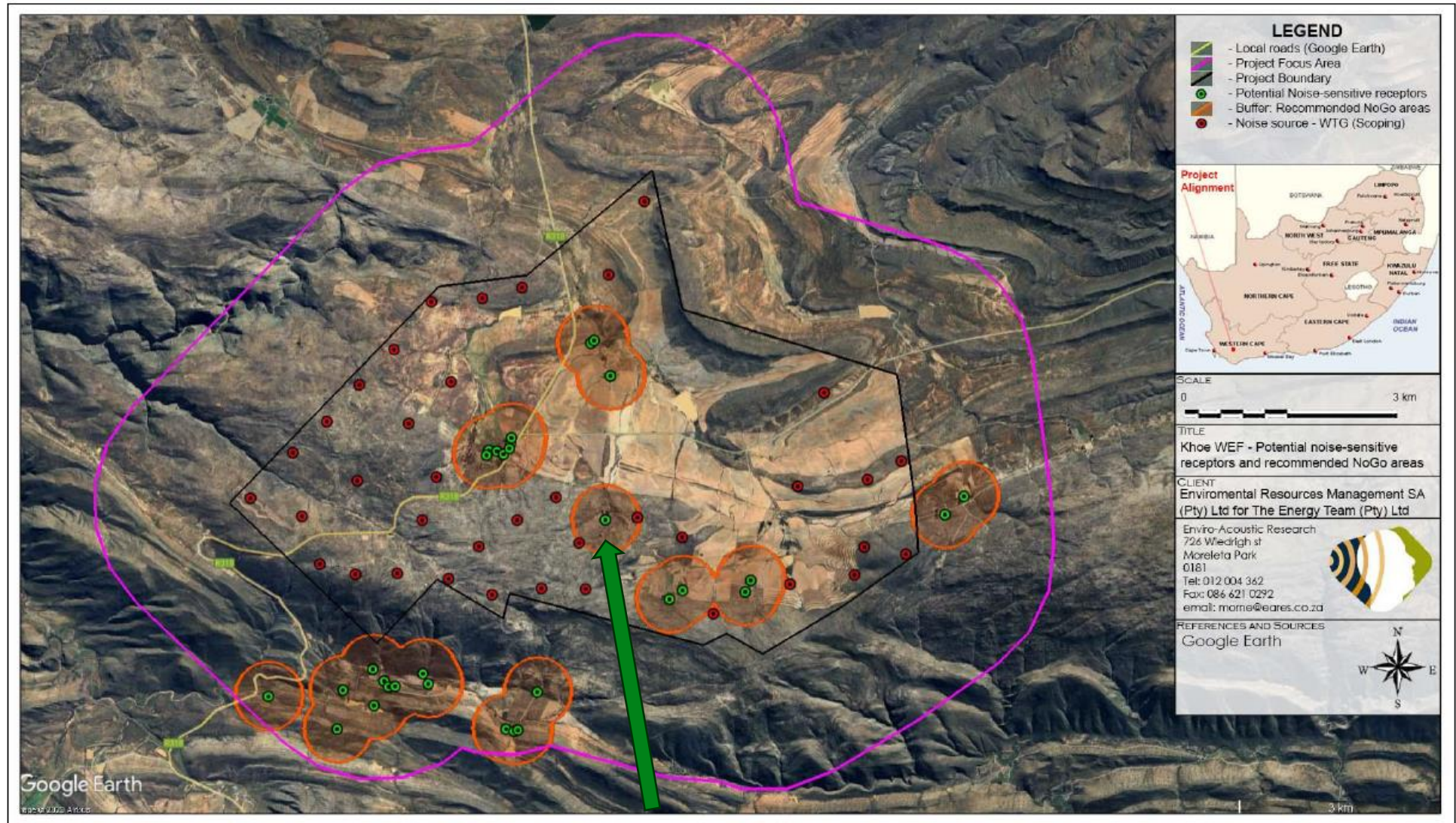
Generally, noises from wind turbines⁴²:

- Could be significant within 500 m from a wind turbine, with receptors staying within 500 m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing. The significance from noise from a wind turbine located within this zone may be high and the development of wind turbines in this area is not recommended. This is recommended to be a No-Go area in terms of noise.
- May be clearly audible when between 500 and 2,000 m from an WTG. Depending on the layout and the sound power emission levels ("SPL"), the significance of the noise impact could be low to high. The WEF layout should be carefully planned when locating wind turbines in this area, as the turbines cumulatively contribute to noise levels at the NSR. This however can only be assessed once both the layout and the SPL of the selected wind turbine model are available.
- Are generally of a low significance at distances greater than 2,000 m, although this again would depend on the layout, the SPL of the wind turbine, as well as local meteorological conditions. There are several new wind turbines with sound power emission levels exceeding 110 dBA (re 1 pW).

It must be noted that the green arrow in Figure 11-1 below is not to be considered as a sensitive noise receptor. This is a camp site that is currently not in use. The campsite will continue to not be in use should the proposed project be approved.

⁴² This is subject to the design of the wind farm, as well as the sound power emission levels (re 1 pW) of the particular wind turbine used at the project

FIGURE 11-1: AERIAL IMAGE INDICATING CLOSEST NOISE-SENSITIVE DEVELOPMENTS WITHIN THE KHOE WEF PROJECT



11.3 FRESHWATER AND WETLAND (AQUATICS)

The DFFE Screening Tool identified two sensitivity ratings within the development footprint, namely, Low and Very High (Table 11-1). There is overlap with the findings on site and the Screening Tool’s outcome, thus the development footprint must be developed with cognisance of these sensitivities.

TABLE 11-1: RESULTS OF THE SENSITIVITY RATING / CONSTRAINTS ASSESSMENTS

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
Wind turbine generators (WTGs), hardstands and crane pads	All delineated wetland systems	High & Very High = No-go with respective buffer (60m)	
	All watercourses / drainage lines	Medium Sensitivity (50m) = No Go	
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	
Buildings / Substations & BES	All delineated wetland systems	High & Very High = No-go with respective buffer (60m)	
	All watercourses / drainage lines	Medium Sensitivity (50m) = No Go	
	Artificial dams	Not Applicable = as these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	
Roads	All delineated wetland systems	LOW if an existing crossing / road or impact is already present, that must then be included in the potential road network	

	All watercourses / drainage lines							
	Artificial dams	Not Applicable = as these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required						
Overhead Lines	All delineated wetland systems	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated where possible as some of the alluvial system are very broad						

Therefore, environmental sensitivity input received from the aquatic ecology specialist will be taken forward and considered within the EIA process and the impact to these areas assessed. Appropriate layout and development restrictions will be implemented within the development footprint to ensure that the impact to aquatic ecology is deemed acceptable by the aquatic ecologist.

The specialist has no objection to the authorisation of the proposed activities assuming that all mitigations and buffer zones are implemented.

11.4 TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)

11.4.1 FAUNA

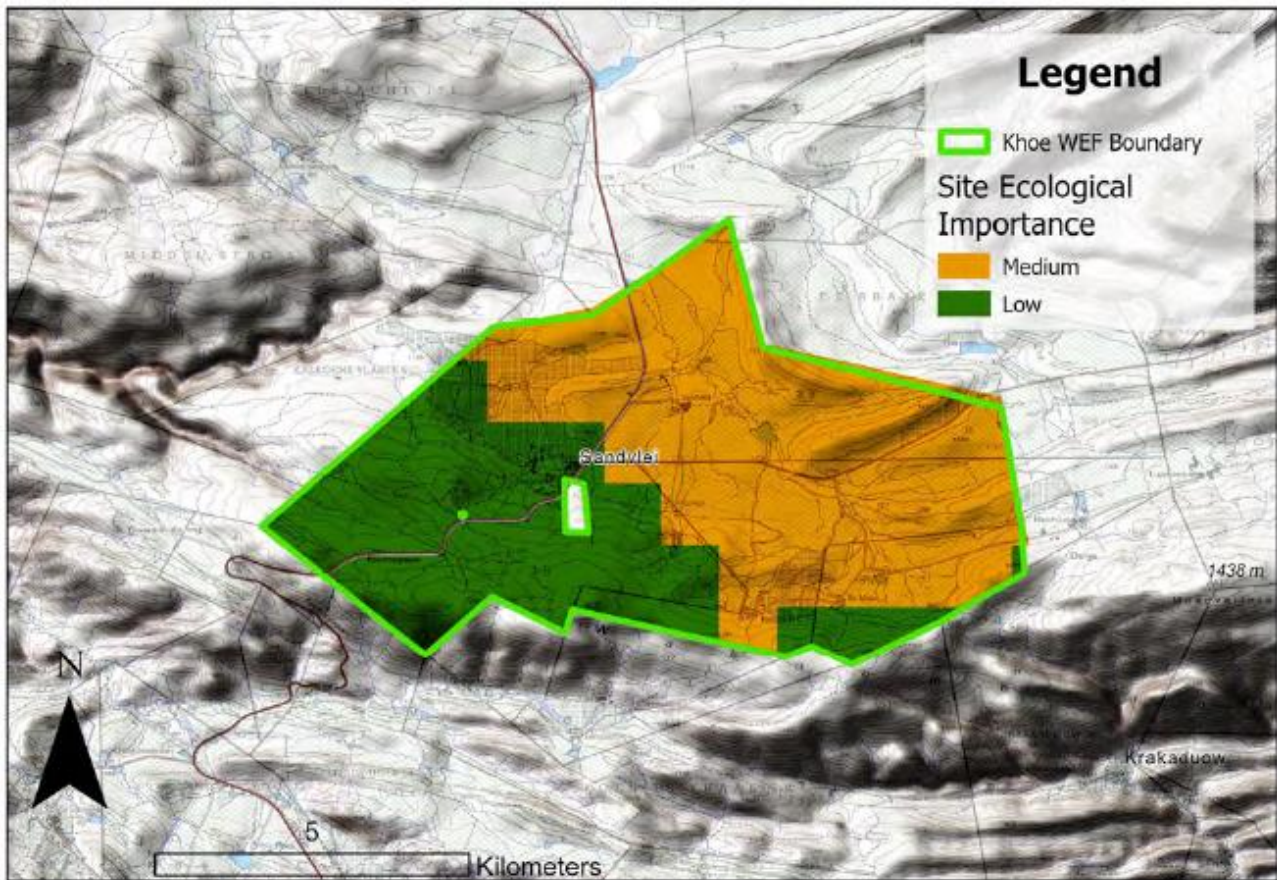
The site ecological importance exercise indicated that parts of the site are of medium ecological importance for Riverine Rabbit, with remaining areas of low ecological importance for Leopard and Grey Rhebok.

TABLE 11-2: SITE ECOLOGICAL IMPORTANCE CALCULATION FOR ANIMAL SPECIES OF CONSERVATION CONCERN RELEVANT TO THE PROPOSED DEVELOPMENT AREA

SCC	Habitat	EOO (km ²)	Status	CI	FI	BI	RR	SEI
Riverine Rabbit	Dry drainage lines, washes and lowland scrub	> 10	CR	High – Confirmed occurrence of CR species that have a global EOO of > 10 km ² and listed under any criterion other than A (C2)	Medium– Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy road network between intact habitat patches	Medium	Medium – Moderate likelihood of remaining at a site even when a disturbance or impact is occurring	Medium
Leopard	Mountain scrub	> 10	VU	High– Likely occurrence	Medium – As above	Medium	High – High likelihood	Low

SCC	Habitat	EOO (km ²)	Status	CI	FI	BI	RR	SEI
				of VU species with fewer than < 10 000 mature individuals			of returning to a site once the disturbance or impact has been removed	
Grey Rhebok	Natural and modified areas	>10	NT	Medium – Confirmed occurrence of NT species listed under Criterion A only and > 10 locations	High – Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches	Medium	High – High likelihood of returning to a site once the disturbance or impact has been removed	Low

FIGURE 11-2: PRELIMINARY SITE ECOLOGICAL IMPORTANCE BASED OFF THE RELATIVELY LOW-RESOLUTION HABITAT SUITABILITY MODEL INCLUDED IN THE NATIONAL WEB-BASED SCREENING TOOL



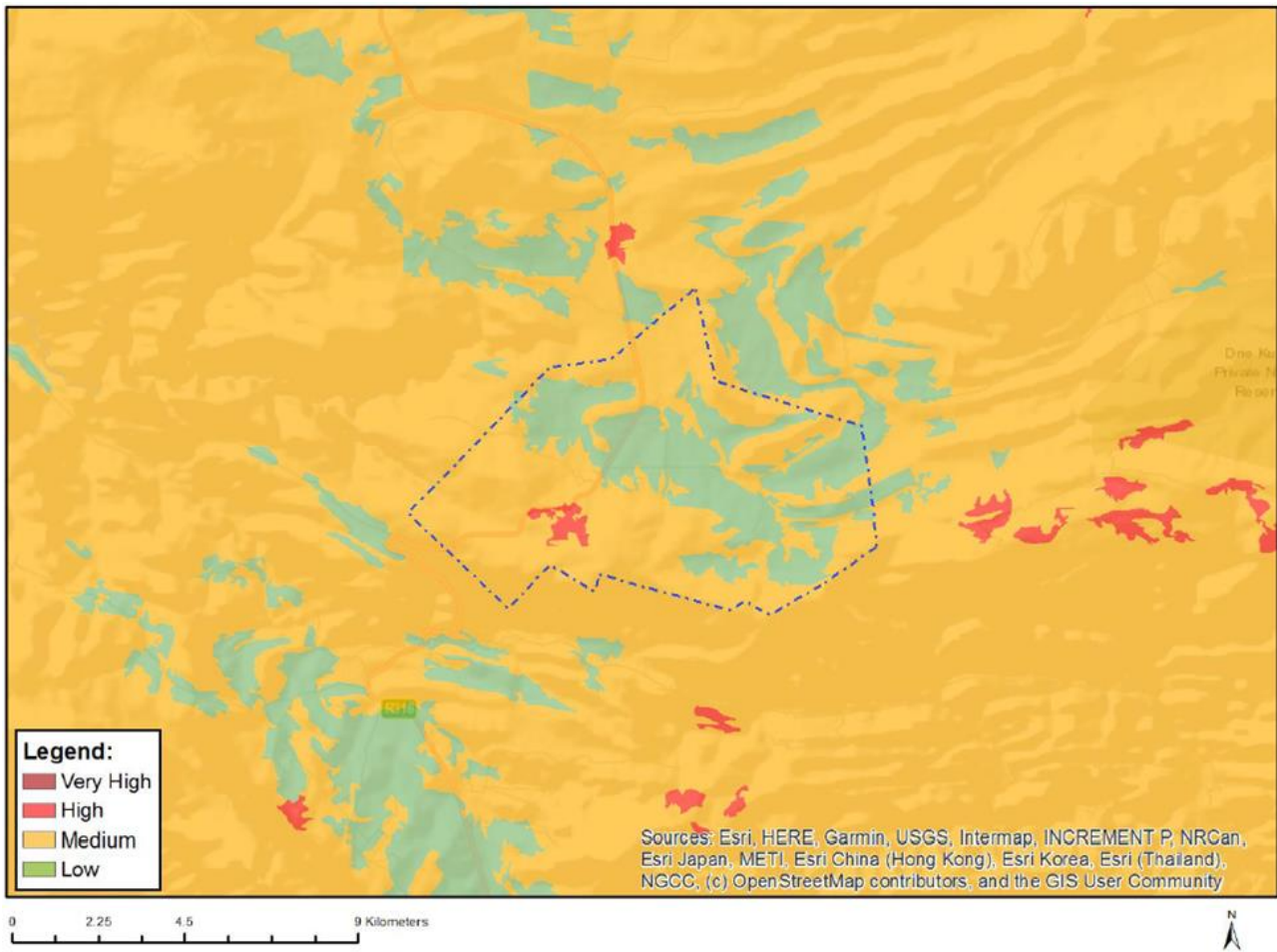
The proposed development appears unlikely to have a significant negative impact on animal SCCs following the implementation of appropriate mitigation measures, including avoidance of areas of elevated sensitivity. The sensitivity areas identified at this stage are not final, and will be significantly refined after detailed analyses of camera trap survey data. The resolution of the sensitivity mapping provided by the National Web-based Screening Tool is wholly inadequate (and misleading) at the scale required to inform project layout design and impact assessment, as this is not its intended purpose.

It is therefore recommended that the application process proceeds to the respective EIA phases for further assessment.

11.4.2 FLORA

The DFFE Online ST identifies the study area as having a predominantly Medium Sensitivity in the Plant Species Theme followed by areas of Low Sensitivity and a single small area of High Sensitivity (Figure 11-3).

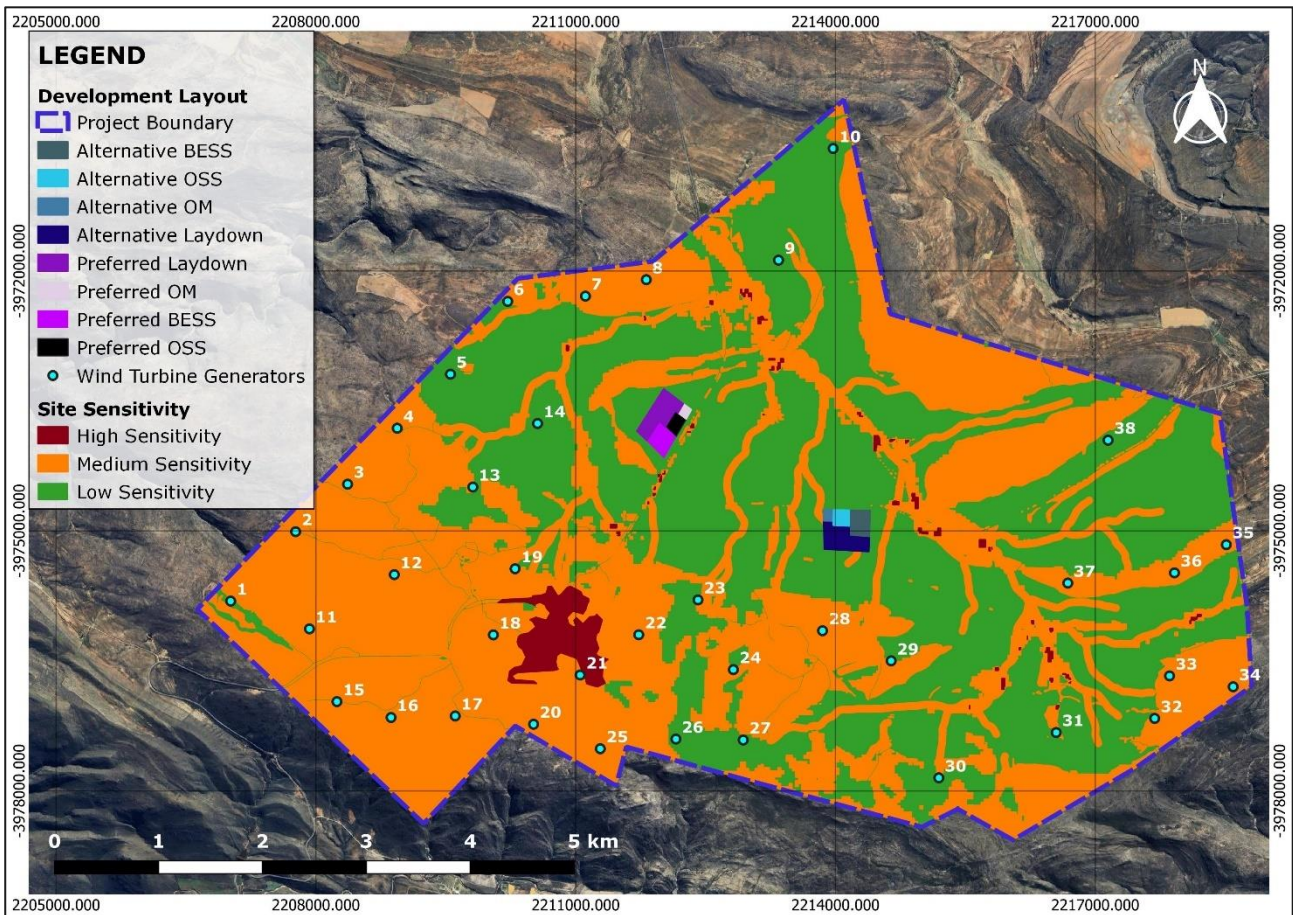
FIGURE 11-3: DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT’S ONLINE SCREENING TOOL ASSESSMENT OF THE PROPOSED KHOE WIND ENERGY FACILITY STUDY AREA IN THE PLANT SPECIES THEME.



A total of 1 782 plant species potentially occur in and/or within close proximity of the proposed Khoe WEF and are presented in the Botanical study in Volume II. The DFFE Online screening tool identified a single CR, four EN, 19 VU, 23 Rare and one Critically Rare plant species according to Regional Red Lists potentially present within the proposed study area. The sources include the SANBI POSA Brahm's (B) database, the Global Biodiversity Information Facility (GBIF) database, The DFFE Online screening tool) and the Biodiversity and Development Institute's Virtual Museum (VM) database.

Preliminary sensitivity is mapped using the SEI in conjunction with satellite imagery and specialist opinion. The preliminary sensitivity map (Figure 11-4) in the Plant Species Theme will be significantly refined following a detailed plant species survey on site and facilitate a more accurate calculation and delineation of the respective SEIs.

FIGURE 11-4: SITE SENSITIVITY MAP FOR THE PROPOSED KHOE WIND ENERGY FACILITY IN THE PLANT SPECIES THEME.



Following the reconnaissance site visit and desktop study, it is the specialist’s opinion that the DFFE Screening Tool’s assessment of the proposed Khoe WEF PAOI as being of predominantly Medium Sensitivity, followed by Low Sensitivity and a small section of High Sensitivity in the Plant Species Theme is accurate, triggering the requirement of a Plant Species Specialist EIA report to be included in the final EIA report.

It should be noted that the conclusions presented here are preliminary, and a final recommendation will be made following the prescribed site survey.

11.5 AVIFAUNA

The initial assessment of the Khoe site combined the Southern AFRICAN Bird Atlas Project (SABAP2) records (n = 80 cards from 14 pentads) and the results of first bird surveys in January 2022, reveal:

- 206 species of bird have been recorded by SABAP2 data around the site;
- 21 of these species are Priority (top 100) collision-prone species;
- 10 of the 21 Priority Collision-prone species are Red Data species from SABAP data; and
- One of the 10 Red Data species likely to occur (SABAP2) was recorded over the Khoe site: Blue Crane.

The position of a Verreaux’s Eagle nest was supplied to by E. Hermann, and its location is plotted in the Figures below.

TABLE 11-3: ALL (21) PRIORITY COLLISION-PRONE SPECIES IN THE TOP 100 PRIORITY SPECIES INCLUDING THE (10) RED DATA BIRDS (IN RED) RECORDED IN BIRD ATLAS DATA (2008-2022) AROUND THE PROPOSED KHOE WEF SITE. THE (4) GREY-SHADED SPECIES OCCURRED IN THE PROPOSED WEF IN

				Susceptibility to:	
Common name	Scientific name	Red-list status	Reporting Rate*	Collision Rank**	Disturbance
Verreaux's Eagle	<i>Aquila verreauxii</i>	Vulnerable	26%	2	Moderate
Martial Eagle	<i>Polemaetus bellicosus</i>	Endangered	9%	5	High
Black Harrier	<i>Circus maurus</i>	Endangered	19%	6	High
Blue Crane	<i>Anthropoides paradiseus</i>	Near Threatened	27%	11	Moderate
Lanner Falcon	<i>Falco biarmicus</i>	Vulnerable	14%	22	moderate
African Fish Eagle	<i>Haliaetus vocifer</i>	Least Concern	15%	27	moderate
Southern Black Korhaan	<i>Afrotis afra</i>	Vulnerable	21%	35	Low
Cape Eagle Owl	<i>Bubo capensis</i>	Least Concern	5%	41	Moderate
Jackal Buzzard	<i>Buteo rufofuscus</i>	Least Concern	49%	42	Low
Peregrine Falcon	<i>Falco peregrinus</i>	Least Concern	6%	45	moderate
Booted Eagle	<i>Aquila pennatus</i>	Least Concern	19%	55	Low
Karoo Korhaan	<i>Eupodotis vigorsii</i>	Near Threatened	50%	49	Low
Steppe Buzzard	<i>Buteo vulpinus</i>	Least Concern	11%	67	Low
Pale Chanting Goshawk	<i>Melierax canorus</i>	Least Concern	44%	73	Low
African Harrier Hawk	<i>Polyboroides typus</i>	Least Concern	14%	85	Low
Spotted Eagle Owl	<i>Bubo africanus</i>	Least Concern	12%	100	low

* Reporting Rates is a measure of the likelihood of occurrence of each species, based on the number of times recorded on bird atlas cards on the 14 pentads around this area.

** Collision ranking is a measure of susceptibility to turbine collisions (Ralston-Paton et al. 2017).

11.5.1 PASSAGE RATES OF PRIORITY COLLISION-PRONE SPECIES

By observing from three Vantage Points (VPs) encompassing the smaller section of the Khoe site in the first site visit in January 2022, we calculated the frequency with which the four Priority species traversed the wind farm in 36-hours of field observations.

- We recorded 19 individual flights of four Priority species (including three Red Data species) in 36-hours in January 2022 giving a medium Passage Rate of 0.53 birds per hour (Table 11-4).
- These included only one Red Data species: Blue Crane.

These are preliminary Passage Rates and reflect the species present in January 2022 (summer). These are incorporated into our other three site visits in 2022 and are also used in the Collision Risk Modelling (CRM) presented below.

TABLE 11-4: PRELIMINARY PASSAGE RATES OF ALL (4) COLLISION-PRONE SPECIES RECORDED IN THE PROPOSED KHOE WEF IN JANUARY 2022

Species	Flights	Hours	Passage Rate
Blue Crane	13	36	0.36
Booted Eagle	4	36	0.11
Jackal Buzzard	1	36	0.03
African Harrier Hawk	1	36	0.03
Totals	19	36	0.24

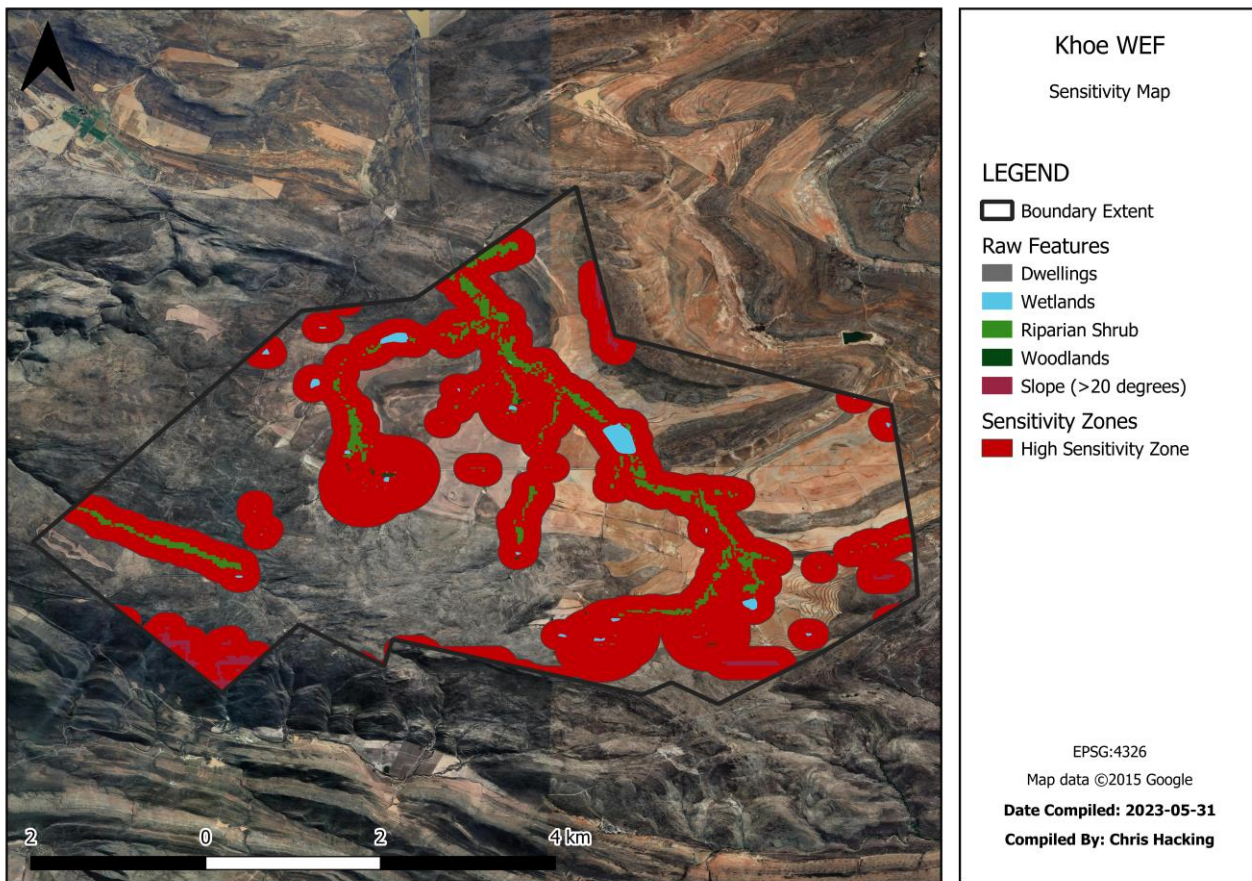
According to the DFFE Screening Tool Report, the Khoe WEF site has been designated as of High Sensitivity with regards to the Animal Species Theme (Volume II).

11.6 BATS

Figure 11-5 below depicts the preliminary sensitivity map. At present, only high-sensitivity zones are identified on the sensitivity map. It is recommended that high-sensitivity zones are avoided for all moving turbine components. This includes the tips of turbine blades. Components of supporting infrastructure might occur in these areas, such as roads, grid connections, substations and office buildings, as long as no bat roosts are disturbed during construction. Guidelines to avoid roost destruction will form part of the EMPr. The following are included in high-sensitivity zones at Khoe WEF with buffers as prescribed by the SABAA guidelines (MacEwan, et al, 2020):

- Clumps of trees which could serve as roosts – 200 m buffer;
- Watercourses. Non-perennial watercourses will have water during rainy spells and standing water which collects in the ditches is an important feature contributing to increased bat activity – 200 m buffer from the side of the water courses;
- Rock formations, rocky outcrops and features which are conducive to bat roosts – 200 m buffer; and
- Human dwellings – 500 m buffer.

FIGURE 11-5: PRELIMINARY BAT SENSITIVITY MAP



11.7 SOCIO-ECONOMIC

The findings of the Social Scoping study indicate that the proposed Khoe WEF project will create several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy that will improve energy security in South Africa and contribute towards reducing the countries carbon footprint.

The potential negative impacts associated with the construction are likely to be Low Negative with mitigation. However, the proposed WEF is in an area that is likely to be visually sensitive and has the potential to impact negatively on several nature reserves and tourist facilities in the area. The attraction of these areas is likely to be linked to the rural character of the area, including the views and vistas. The potential impact on these operations will need to be assessed during the Assessment Phase.

11.8 HERITAGE AND PALAEOLOGY

Although the Khoe WEF is located in an area of high to very high paleontological sensitivity this is not a red flag or fatal flaw and should not constrain the proposed development, provided suitable measures to mitigate any impacts are implemented as part of the development of the WEF. Mitigation measures will be detailed in the HIA and may include site visits by a paleontologist, the monitoring of earthworks by the ECO and the implementation of a protocol or mechanism for reporting and dealing with chance finds of fossil material made during project activities.

Archaeological sites are generally limited in extent and have much smaller constraints footprints on development than those applicable to biodiversity or ecology, for example. It is generally possible to mitigate or avoid impacts on these resources arising from WEF developments should they be found to be present within the development footprint. Experience from many previous WEF and solar developments has shown that the presence of archaeological resources within a development area is seldom a fatal flaw, and this is likely to be the case for the Khoe WEF project, provided suitable mitigation measures are implemented.

The proximity of formal historical burial grounds in or near farm complexes means that they are likely to be avoided in the planning and siting of the project. Although historical graves and burials are extremely sensitive heritage receptors, their presence within the project area is not a fatal flaw, provided they are excluded from impacts during the development process.

With respect to unmarked usually pre-colonial graves, they too are an extremely sensitive and often contested heritage resource, and it is generally impossible to predict their presence in advance of development. However, the inclusion in the project Environmental Management Programme of a procedure for reporting and dealing with chance finds of human remains will ensure that the sensitivity of the development with respect to this potential heritage resource is low and that they will not be a fatal flaw.

The cultural landscape within which the Khoe WEF will be located is likely to be the heritage resource most affected by the construction of the WEF. The introduction of the large infrastructural elements associated with a WEF into a generally rural landscape with identified scenic value has the potential to have a high negative impact but need not be a fatal flaw if suitable measures to mitigate the intrusion of the WEF into the landscape can be implemented.

11.9 VISUAL/ LANDSCAPE

11.9.1 POTENTIAL VISUAL EXPOSURE

The result of the scoping viewshed analyses for the proposed Khoe WEF is shown on Figure 11-6.

The analysis has been undertaken from each proposed turbine position as indicated within the proposed development area of Khoe WEF to determine the general visual exposure (visibility) of the area under investigation. It is expected, from a visual impact perspective, that the wind turbines themselves would constitute the highest potential visual impact of the WEF, therefore, the viewshed analysis for the facility was undertaken at an offset of maximum 250m above average ground level (i.e., the approximate maximum blade tip height of the turbines).

The result of the viewshed analysis displays the potential areas of visual exposure. Land that is more elevated is typically more exposed to the proposed WEF, whilst lower lying areas such as valleys are shielded, or not as exposed.

It must be noted that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed wind turbines, therefore signifying a worst-case scenario.

Figure 11-6 indicates areas from which the proposed Khoe WEF could potentially be visible, as well as proximity offsets (5km, 10km and 20km) from the proposed development area. Typically, structures of this height (i.e., 250m) may be visible from up to 20km away. In this respect, the anticipated Zone of Visual Influence for this facility as calculated from the development footprint (i.e., determined from the edge of the proposed development areas) has been indicated at 20 km. The extent of visual exposure within this zone is expected to be very high.

The following is an overview of the findings of the viewshed of Khoe WEF only, based on the layout illustrated on the Map provided:

0 – 5km

The proposed facility will have a large core area of potential visual exposure on the project site itself, and within a 5km radius thereof. Small visually screened areas can be found to the south east and far west.

Potential sensitive visual receptors within this visually exposed zone include residents of a few scattered homesteads/farmsteads, as well as a portion of the Drie Kuilen Private NR. This zone also contains the R318, a regional road which traverses the proposed site. Observers travelling along these roads will similarly be exposed to the WEF infrastructure.

5 – 10km

Potential visual exposure is still fairly concentrated within this zone though it does become slightly more scattered (i.e., between 5 and 10km). Visually screened areas can be found to the north east, south east and south and are associated with the screening effects of the hilly topography.

Sensitive visual receptors comprise residents of homesteads/farmsteads scattered around the site. Additionally, potential sensitive visual receptors include observers travelling along the R318, and other secondary roads. The Druie Kuilen Private NR is located within this zone and may also potentially be impacted upon.

10 – 20km

In the longer distance (i.e., between 10 and 20km offset), the extent of potential visual exposure is largely reduced with visually exposed areas concentrated to the north east, south east and west. The Langeberg mountain range visually screens the areas to the south, while the Kwadousberg visually screens areas to the north.

Sensitive visual receptors comprise residents of homesteads/farmsteads scattered throughout the area as well as portions of De Doorns. Additionally, potential sensitive visual receptors include observers travelling along the R318 and N1, as well as various secondary roads.

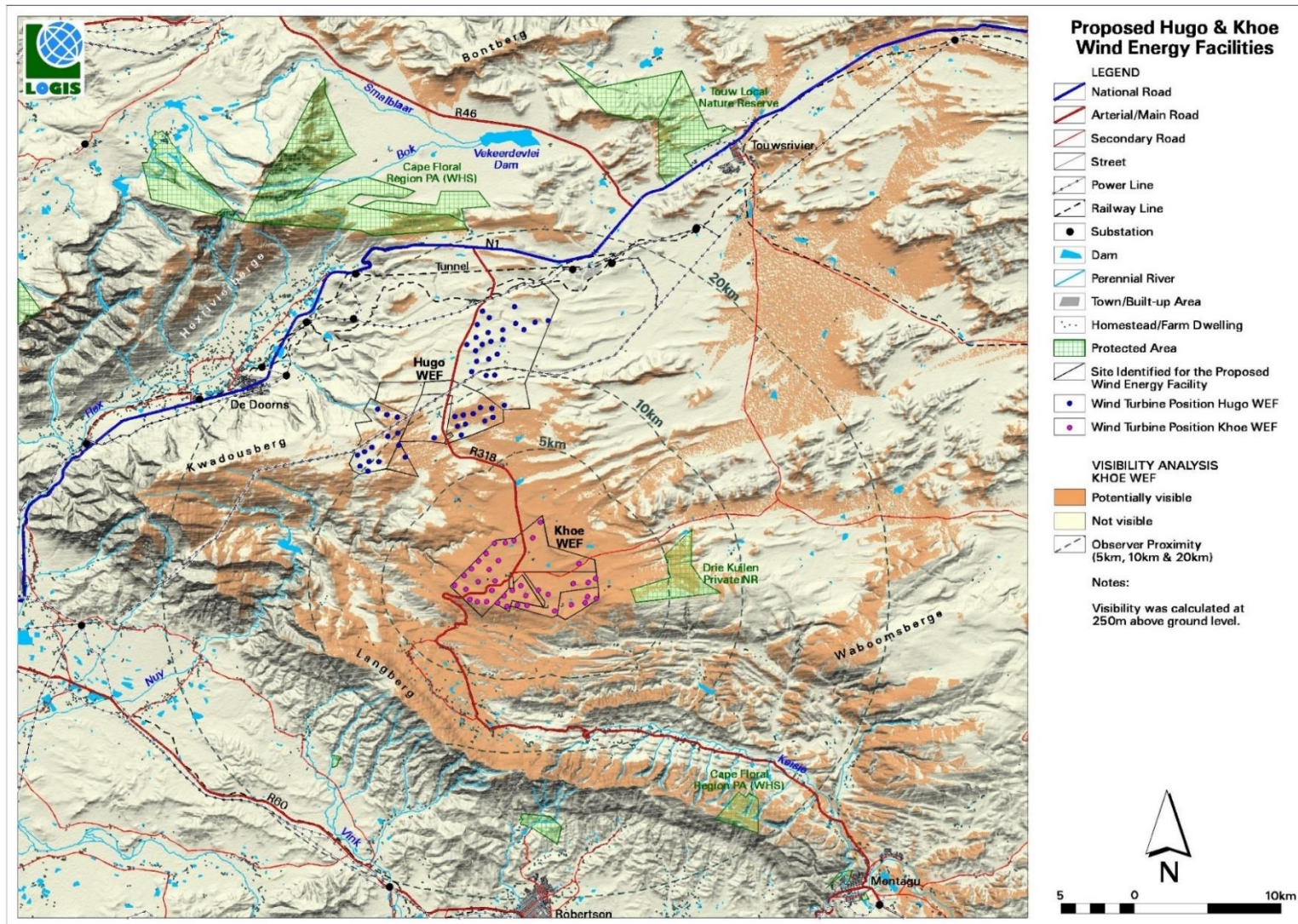
Cape Floral Region PA World Heritage Site may also be visually impacted upon by the proposed WEF.

> 20km

Beyond the 20 km offset from the proposed site, potential sensitive visual receptors are not likely to be visually exposed to the proposed facility, despite lying within the viewshed.

In general terms it is envisaged that the turbines associated with the proposed Khoe WEF, where visible from shorter distances (e.g., less than 5km and potentially up to 10km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a high to very high visual impact. This may include tourists visiting the region, observers travelling along the roads, as well as residents of the farm dwellings mentioned above.

FIGURE 11-6: POTENTIAL VISUAL EXPOSURE (VISIBILITY ANALYSIS) OF THE PROPOSED KHOE WEF



11.9.2 VISUAL SENSITIVITIES

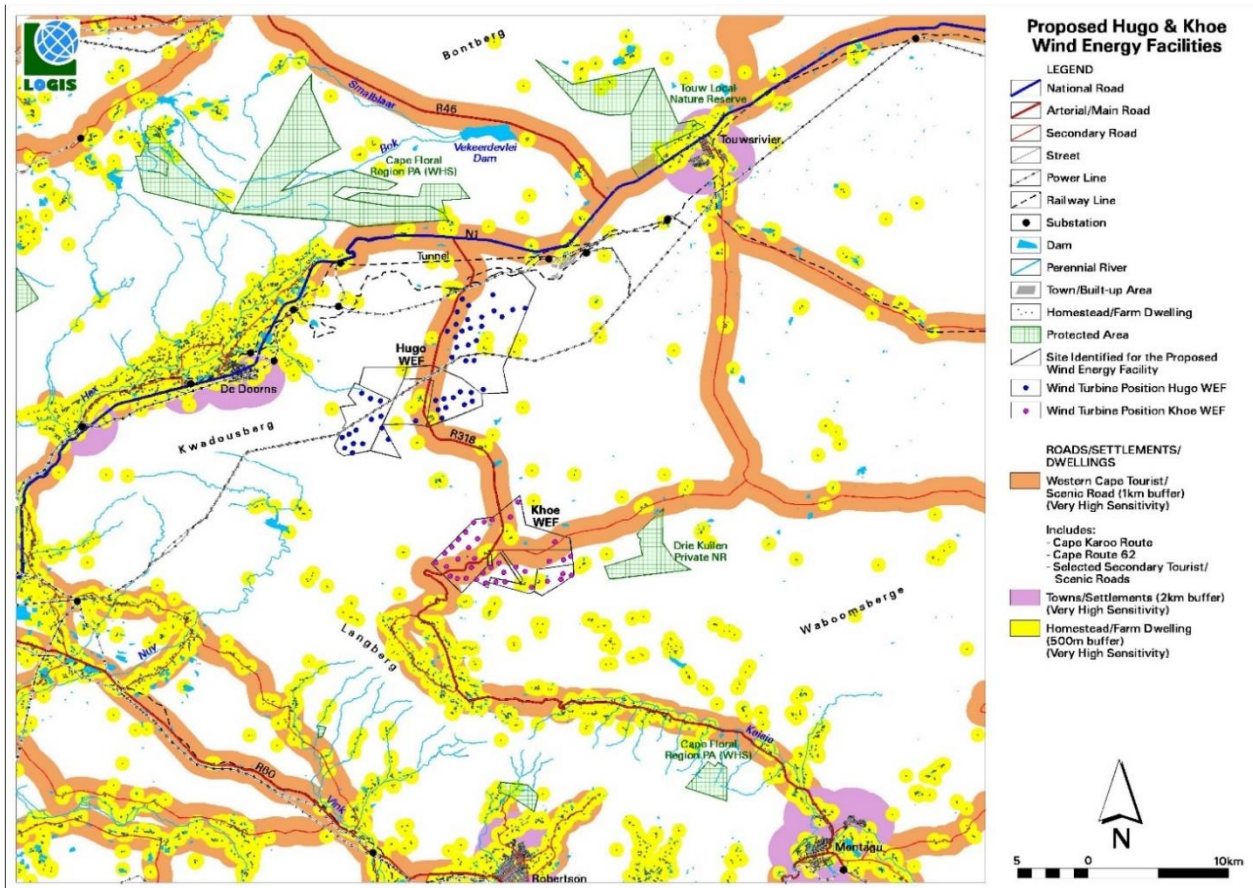
According to the DFFE Screening Tool, the site has a very high sensitivity for shadow flicker since the site is located near temporarily/permanently inhabited residence. Similarly, the DFFE screening tool generated for Khoe WEF indicated that the site has a very high sensitivity for landscape, as the site is located on top of mountains and high ridges, slope of more than 1:4, Mountain catchment area, within 3 km of a nature reserve/protected area and within 250 m of a river.

The criteria for the identification of visually sensitive areas (scenic resources) and potential sensitive visual receptors are as follows:

- Proximity to roads – to avoid encroachment of wind turbine structures to public roads (especially in natural, rural and scenic areas), thereby reducing the potential visual impact on road users and tourists.
 - Scenic routes- 1 km buffer
 - National roads - 500m buffer
 - Arterial and main roads – 350m buffer
 - Secondary roads – 150m buffer15 turbines for Khoe WEF are located within the scenic roads buffer of the R318.
- Proximity to inhabited residences (homesteads), settlements and towns- reduce general observer proximity to wind turbine structures and avoid potential shadow flicker issues, generally anticipated to occur at distances of less than 500m from built structures and 2km from towns.
 - Wind turbines should not be placed within a 500m buffer zone from residences.

Two (2) turbines are located within 500 m from a homestead. These turbines will be micro-sited and assessed further during the EIA phase.

FIGURE 11-7: PROXIMITY TO SCENIC ROUTES, TOWNS / SETTLEMENTS AND HOMESTEADS



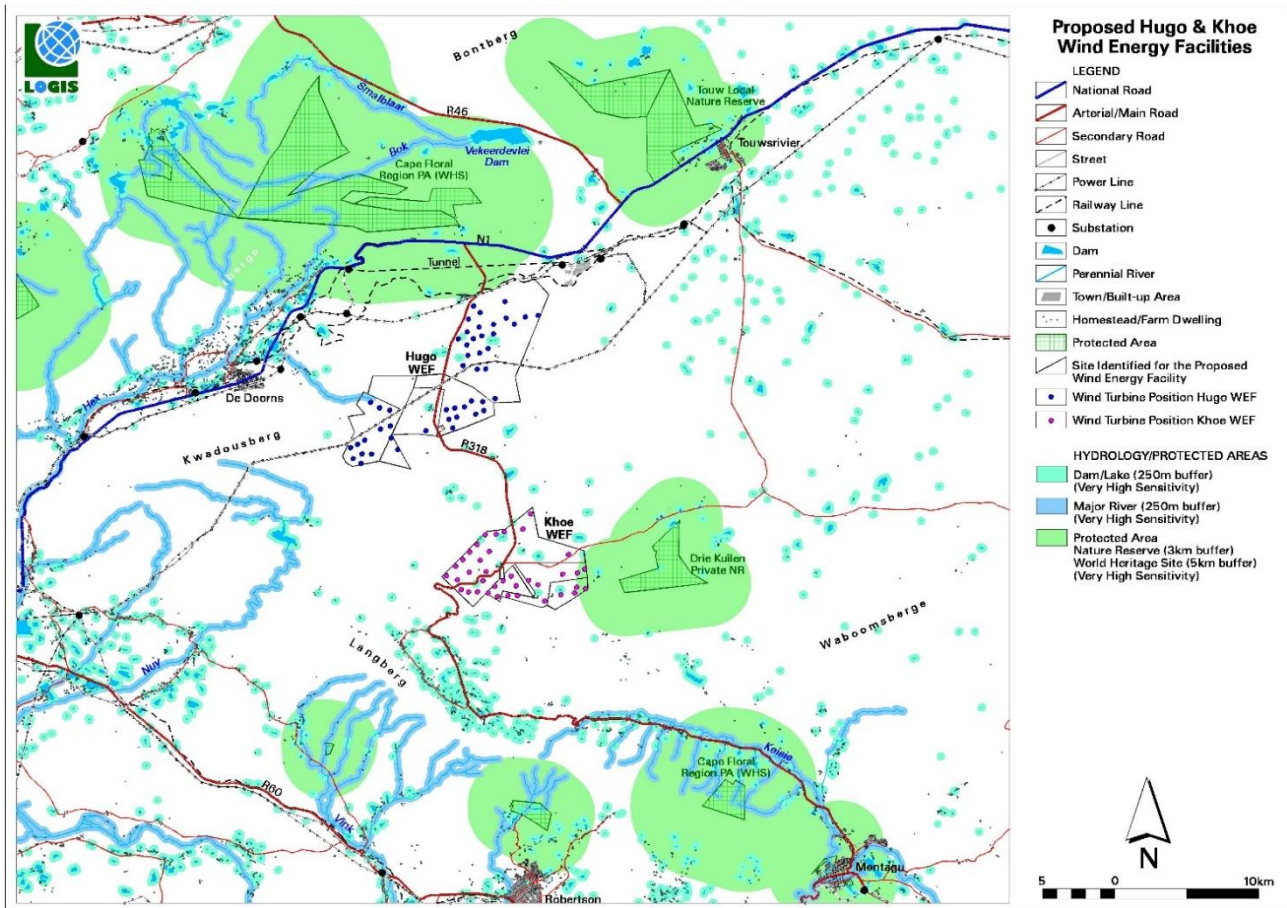
- Proximity to protected areas and tourist attractions (if present)** – the potential land use conflict between nature orientated tourism and the potential visual impacts associated with wind turbines may be mitigated to some degree by adhering to a minimum 1km (or other negotiated threshold) exclusion zone.

 - Wind turbines should not be placed within a 3km buffer zone from protected areas (nature reserves) or known tourist attractions.
 - Wind turbines should not be placed within a 5km buffer zone from protected areas (World Heritage sites).
 - Four (4) turbines are located within the 3 km buffer of the Drie Kuilen Private NR.
- Proximity to dams/lakes and major rivers** - to minimize land use conflicts and potential visual impacts associated with wind turbines may be mitigated to some degree by adhering to a minimum 250 m (or other negotiated threshold) exclusion zone.

 - Wind turbines should not be placed within a 250 m buffer zone from any watercourse.

Three (3) turbines encroach within the 250 m of dams/lakes.

FIGURE 11-8: PROXIMITY TO WATERCOURSES AND PROTECTED AREAS

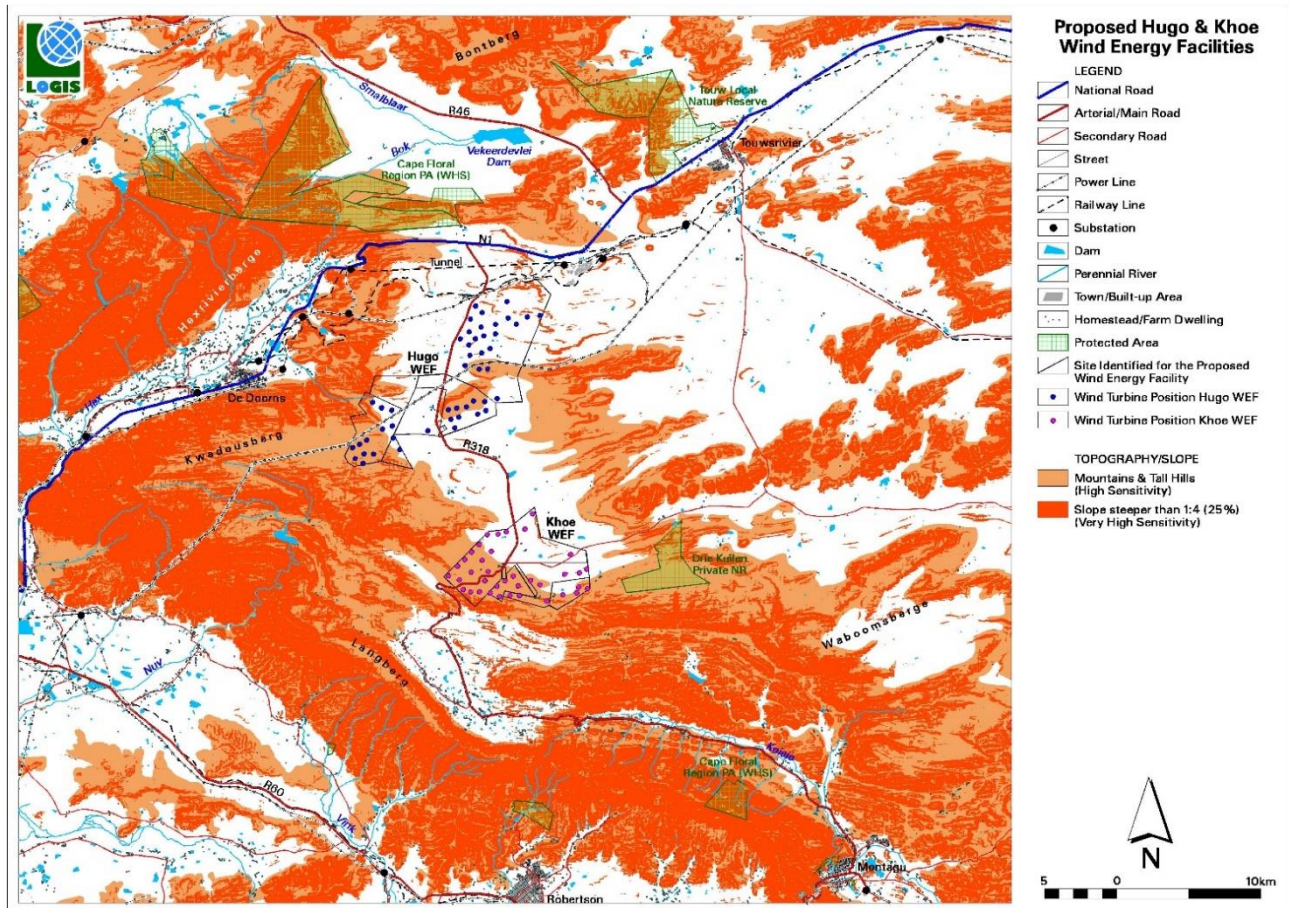


- **Steep slopes, prominent hills, ridges and skylines** - Avoid the placement of wind turbines on these topographical units.
 - Elevated terrain (hills, ridges and mountains) are considered to be scenic topographical features, generally more exposed than areas with even or level slopes (e.g. plains).
 - The placement of turbines on these elevated topographical units will increase the visual exposure (visibility) and prominence of the structures within the landscape.

The construction of access roads along steeper and elevated slopes will be visually exposed due to the removal of vegetation cover, and may pose an aggravated visual impact due to the risk of erosion scarring.

It appears that five (5) turbines may be located on slopes of more than 1:4, while 24 turbines are located on mountains and tall hills. This is as a result of the general topography (undulating plains) found within this area. The turbines have also been strategically placed in light of good wind resources.

FIGURE 11-9: PROXIMITY TO STEEP SLOPES AND MOUNTAINS / RIDGES



11.10 TRAFFIC

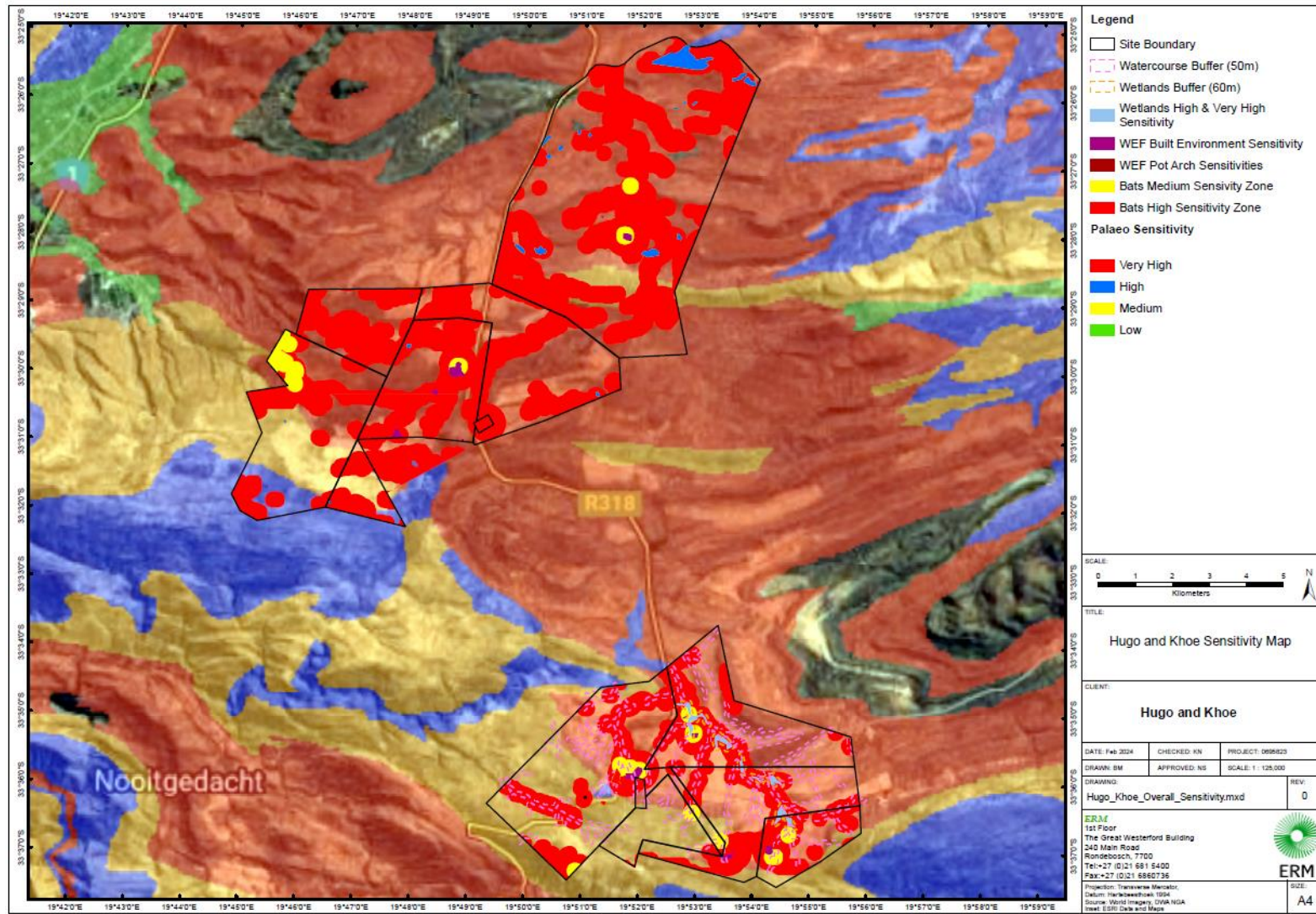
Based on the nature and extent of the proposed Khoe WEF development, some level of disturbance can be expected on the immediate road network and regionally because of the construction and operational phases. The overall potential impact is expected to be moderate to low during both the construction phase and operational phase, respectively.

It is the opinion of the traffic engineering project team that the impacts associated with the project can be assessed and mitigated to an acceptable level for Khoe WEF site. The preferred sites for the Khoe WEF on-site substation, O&M buildings are recommended for Environmental Authorisation from a traffic and transportation perspective.

11.11 PRELIMINARY SITE SENSITIVITY EVALUATION

Sensitive areas will be reassessed in the EIA phase, and will be based on additional site visits, where necessary. The majority of the turbines are currently out of no-go areas; however, some turbines were found to be within proximity to noise sensitive receptors, as well as some cultural heritage sites, visual receptors and possibly some bat roosting areas. Sensitivity buffers will be included in the EIA phase. A preliminary sensitivity map illustrating the abovementioned sensitivities within the proposed project area can be found in Figure 11-10. Please note that this map will be refined during the EIA phase of the project. Another map illustrating the Riverine Rabbits camera traps in relation to the WTG has been included in Figure 11-11.

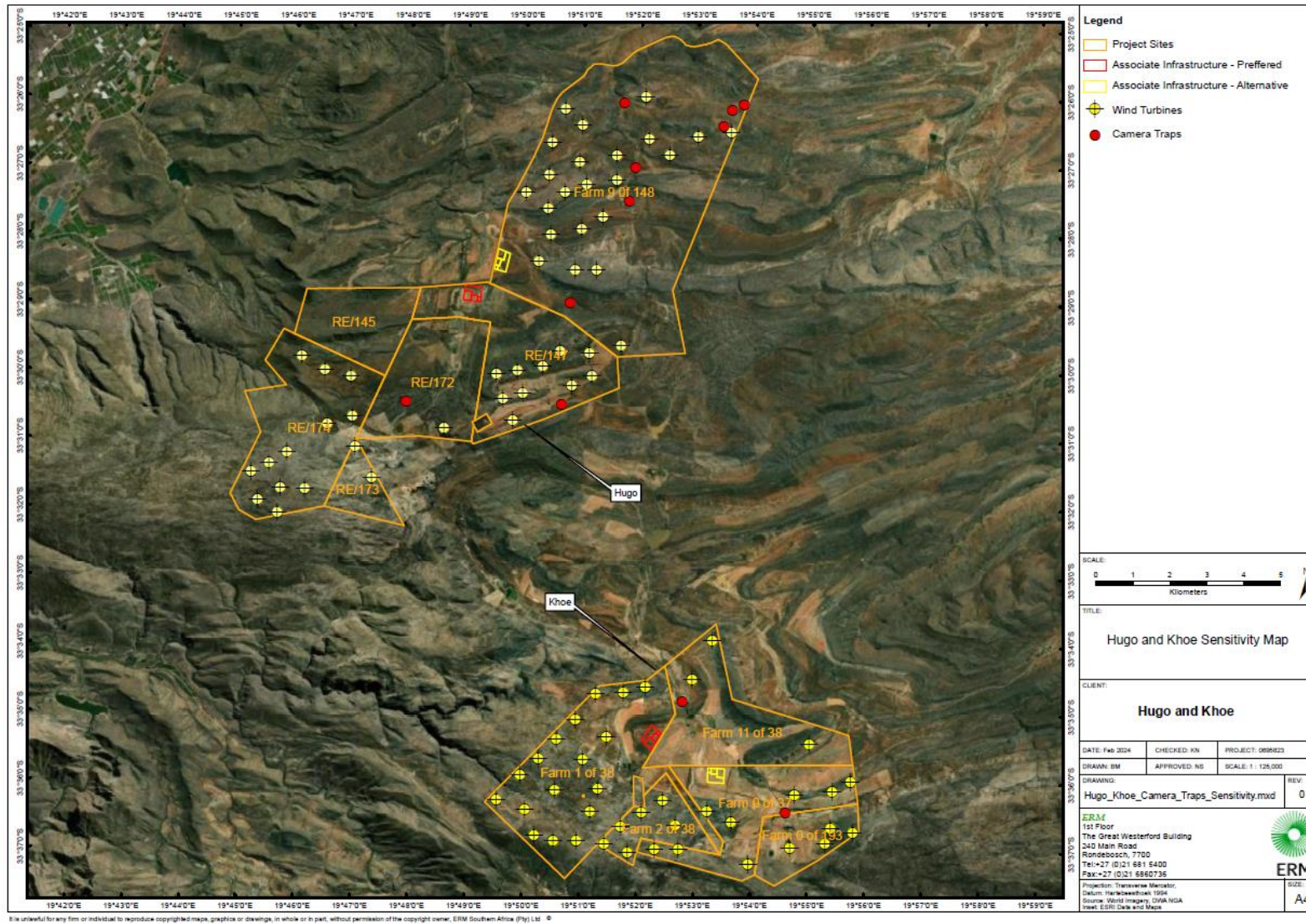
FIGURE 11-10: PRELIMINARY SENSITIVITY MAP



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FIGURE 11-11: LAYOUT MAP ILLUSTRATING RIVERINE RABBITS CAMERA TRAPS



11.12 CONCLUSION

Based on the outcome of the specialist scoping inputs, potential negative impacts associated with the proposed development are anticipated mainly to be of medium to low significance after mitigation, while some positive socio-economic impacts of moderate significance are expected. Areas of concern have been noted, specifically in the Cultural Heritage, Noise, Bats and Visual / Landscape themes, where buffers need to be implemented and mitigation measures need to be applied. Therefore, specialists opinion has deemed the project to be acceptable and recommended to proceed to the EIA phase.

Based on the preliminary assessment of impacts for the proposed development the EAP can conclude that the project should be allowed to proceed into the EIA phase. The specialist's assessments have identified areas of further investigation, and these will be assessed during the EIA phase, together with any additional impacts or concerns raised during the public participation process. A preliminary layout was produced and provided to specialists for consideration during the scoping phase. This layout will be revised further during the EIA phase of the process to be informed by buffers and constraints provided by specialists. Any additional constraints and buffers recommended by the specialists during the EIA phase, will be taken into consideration and a Final Mitigated Layout will be produced and submitted as part of the Final EIA Report. Comments received from I&APs during the public participation comment period will be taken into consideration to inform the final scoping report and EIA.

12. PLAN OF STUDY FOR EIA

A detailed description of the nature and extent of the proposed Khoe WEF and its associated infrastructure, details regarding the Scoping process followed, as well as the issues identified and evaluated through the Scoping Phase have been included in this Scoping Report. The Section of the report provides the Plan of Study for the Environmental Impact Assessment (EIA) for the proposed development.

The EIA Phase of the study includes detailed specialist studies for those impacts recorded to be of potential significance, as well as on-going public consultation. Potential impacts associated with the following project development features will be assessed as part of the EIA phase:

- Wind Energy Facility;
- Battery Energy Storage System, including the storage of dangerous goods in containers;
- Proposed substation and electric cabling;
- Laydown area and site offices; and
- Access and internal roads.

12.1 AIM OF THE EIA PHASE

The EIA Phase will aim to achieve the following:

- Provide a detailed assessment of the need and desirability of the proposed development taking into consideration specialists findings, I&AP comments as well as the necessary guidance documents;
- Provide an overall assessment of the social and biophysical environment affected by the proposed development;
- Assess potentially significant impacts (direct, indirect and cumulative impacts) associated with the proposed development;
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts;
- Undertake a fully inclusive public involvement process to ensure that I&AP's are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA report will address potential environmental impacts and benefits associated with all components of the of the proposed development including the design, construction, operation and decommissioning, and will aim to provide the competent authority with sufficient information to make an informed decision regarding the proposed development. All feasible alternatives (including the no-go alternative) will be assessed.

12.2 CONSIDERATION OF ALTERNATIVES

The following alternatives will be investigated in the EIA:

- The 'do nothing or no-go alternative;
- Design alternatives; and
- Alternative technologies (i.e., various wind turbine options).

12.3 AUTHORITY CONSULTATION

Consultation with the regulatory authority (i.e., DFFE and Western Cape DE consultation) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of the Final Scoping Report following a 30-days public review period (and considering of comments received).
- Submission of the EIA Report for a 30-days public review period, as well as the final report including all comments received.
- Consultation and site visit (if required) with the authorities (DFFE) to discuss the findings and conclusions of the EIA Report.

12.4 PUBLIC PARTICIPATION PROCESS

A public participation process will be undertaken by ERM in accordance with the requirements of the EIA Regulations. Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to provide input to the project, and to comment on the findings of the EIA process.

The EIA Report will be made available for public review for a 30-day period prior to the finalisation and submission to the DFFE for review and decision-making. Comments received during the review period will be captured and addressed the comment and responses report which will form part of the final EIA Report will be submitted to the DFFE for decision making.

12.5 METHODOLOGY OF ASSESSMENT OF POTENTIAL IMPACTS

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity or importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (or importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use. The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

A 7-step approach for the determination of significance of potential impacts was developed by ERM to align with the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended). This 7-step approach was adapted from standard ranking metrics such as the Hacking Method, Crawford Method etc. and complies with the method provided in the EIA guideline document (GN 654 of 2010) and considers international EIA Regulatory reporting standards such as the newly amended European Environmental Impact Assessment (EIA) Directive (2014/52/EU).

Specialists, in their terms of references, will be supplied with this standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making.

The approach is both objective and scientific based to allow appointed specialists and EAPs to retain independence throughout the assessment process. This methodology is included in the following subsections.

12.5.1 PREDICTION OF POTENTIAL IMPACTS

The prediction of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different. For example, during the construction phase, traffic volumes are far greater than during the operational life of a WEF.

The project team has experience from environmental studies for other projects in the locality of the proposed development. The team is, therefore, able to identify potential impacts based on their experience and knowledge of the type of development proposed and the local area. Their inputs inform the scope for the S&EIA process.

Each specialist assessment considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following identification of potential environmental impacts, the baseline information was used to predict changes to existing conditions and undertake an assessment of the impacts associated with these changes, which will also inform the PSEIA.

12.5.1.1 ASSESSMENT OF POTENTIAL IMPACTS

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity or importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (or importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use. The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e., sensitivity/importance and predicted degree of alteration from the baseline).

Specialists, in their terms of references, were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. The methodology⁴³ as outlined below indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the EIA Regulations, 2014 (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

Extent (special scale)

⁴³ Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium-term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

Intensity

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g., pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, the opposite, positive descriptions for criteria will be used.

Degree of Confidence in Predictions

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L

Duration	H			
	M			Medium
	L	Low		

Intensity = M

Duration	H			High
	M		Medium	
	L	Low		

Intensity = H

Duration	H			
	M			High
	L	Medium		

	L	M	H
--	----------	----------	----------

Extent

Positive impacts are ranked in the same way as negative impacts but result in high, medium or low positive consequence.

Overall significance of impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	Definite Continuous	H	MEDIUM		HIGH
	Possible Frequent	M	MEDIUM		
	Unlikely Seldom	L	LOW	MEDIUM	
			L	M	H
			CONSEQUENCE		

Mitigation Measures

Measures to avoid, reduce or remedy significant adverse impacts identified, are termed mitigation measures. Where the assessment process identifies any significant adverse impacts, mitigation measures are proposed to reduce those impacts where practicable. Such measures include the physical design and operational measures. Design alterations such as the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant).

12.5.1.2 CUMULATIVE IMPACT ASSESSMENT

In accordance with the EIA Regulations, consideration is also given to 'cumulative impacts'.

Cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis. For example, the landscape impact of one WEF may be insignificant, but when combined with another it may become significant.

For this assessment cumulative impacts are defined and will be assessed in the future baseline scenario, i.e., cumulative impact of the proposed development = change caused by proposed

development when added to the cumulative baseline. The cumulative baseline includes all other identified developments. In the cumulative assessment the effect of adding the proposed development to the cumulative baseline is assessed.

In line with best practice, the scope of this assessment will include all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 km radius of the site. Therefore, all potential projects are included, even though it is unknown how many of these will be constructed.

Renewable energy sites included for cumulative impact assessment are based on the knowledge and status of the surrounding areas at the time of the specialists compiling their assessments, these will be updated as applicable through the EIA process.

A preliminary assessment of cumulative impacts has been made in the Scoping Phase and will be assessed further in the EIA Phase.

12.6 SPECIALIST PLAN OF STUDY

12.6.1 SOIL AND AGRICULTURAL POTENTIAL

Compliance with the allowable development limits will be assessed in the EIA phase, once the footprint of the facility has been finalized.

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. An aspect of wind farm layout that can cause unnecessary fragmentation of croplands is the location of turbine access roads within croplands. This will be assessed in the EIA phase.

12.6.2 NOISE

The purpose of an environmental noise impact investigation and assessment is to determine and quantify the acoustical impact of, or on a proposed development. Work that will take place during the EIA phase is defined in section 8 of SANS 10328:2008. The Plan of study for the NIA is detailed as follows:

- Data (layout and SPL of selected WTG) as received from the developer will be used to model the potential noise impact. The following information will be considered:
 - The SPL details of a WTG that may be used at this WEF (a worst-case noise source will be used for the construction phase);
 - The latest (final) WEF layout to be assessed;
 - The surface contours of the project focus area;
 - Surface and meteorological constants;
- The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected), as well as the extent of the impact;
- The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations.

12.6.3 FRESHWATER AND WETLANDS (AQUATICS)

12.6.4 FRESHWATER AND WETLANDS (AQUATICS)

The proposed methods used in this assessment have been developed with the renewable industry in mind, coupled to the minimum requirements stipulated by DFFE and the Department of Water and Sanitation. These have been successful in assessing the direct, indirect and cumulative impacts of ca 180 renewable energy projects (2010 – 2023), of which 23 have been constructed. The method includes:

- Desktop analysis
- Site investigation
- Compilation of one draft and one final site screening / sensitivity report for the project which adheres to the following (this list is not exhaustive):
 - The Initial Site Sensitivity Verification reporting requirements for environmental themes set out in Government Gazette No. 43110 which was promulgated on 20 March 2020 in terms of section 24(5)(a) and (h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).
 - Identification and mapping of any discrepancies with the environmental sensitivity as identified on the national web based environmental screening tool.
 - Identification of sensitive areas to be avoided (including corresponding spatial data) and the determination of the respective buffers (if applicable) for each site.
 - Initial recommendations for the layout and allowable development footprint from a surface water and aquatic biodiversity perspective (including corresponding spatial data).
 - Recommendations regarding the areas to be utilised for solar technologies within the project site from a surface water and aquatic biodiversity perspective (including corresponding spatial data)
- Assess the potential impacts, based on a supplied methodology, including cumulative impacts and for pre-construction, construction, operations, and decommissioning phases.
- Provide mitigations regarding project related impacts, including engineering services that could negatively affect demarcated wetland areas.
- Supply the client with geo-referenced GIS shape files of the wetland / riverine areas.

12.6.5 TERRESTRIAL BIODIVERSITY (FAUNA AND FLORA)

12.6.5.1 FAUNA

To fulfil the requirements of the Protocols described in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts of Terrestrial Animal Species, Government Gazette No. 43855, Government Notice No. 1150, 30 October 2020, a terrestrial animal species survey must be conducted.

A drive transect method will be used to record all animal species encountered across the site in each respective habitat as determined by the specialist. In addition, camera traps may be deployed to further assist in a detailed delineation, characterization and condition assessment of the preferred habitats of SCC present on site. This will allow for detailed mapping of any potential No-Go and highly sensitive areas in addition to expanding on the significance of the anticipated impacts and mitigation measures presented in this Scoping Report.

In compliance with the Protocols described above for High Sensitivity triggers, a Terrestrial Animal Species Specialist Impact Assessment Report must be submitted in accordance with the requirements for a Very High- or High Sensitivity in the Terrestrial Animal Species Theme. The results from this survey will be used to refine sensitivity maps and inform the level of mitigation of impacts in relation to the mitigation hierarchy to be included in the associated EMPr.

12.6.5.2 FLORA

A plant species survey must be conducted to account for the large number of potential SCC, and a pre-construction walkthrough during optimal flowering period to ensure avoidance of plant SCC.

A belt-transect method will be used to record all new species encountered across the site in each respective habitat, until no new species are recorded within a 30 to 60-minute period after recording the last depending on the progress made. This survey will also facilitate a detailed delineation, characterization and condition assessment of the different habitats present on site and their respective species composition, and detection of SCC. This will allow for detailed mapping of any potential No-Go and highly sensitive areas in addition to expanding on the significance of the anticipated impacts and mitigation measures presented in this Scoping Report.

In compliance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts of Terrestrial Plant Species, Government Gazette No. 43855, Government Notice No. 1150, 30 October 2020 and the associated Amendment published in Government Gazette No. 47448, Government Notice No. 2717, 4 November 2022, for High Sensitivity triggers a Plant Species Specialist Impact Assessment Report must be submitted in accordance with the requirements for a Very High- or High Sensitivity in the Plant Species Theme. The results from the plant species survey will be used to refine sensitivity maps and inform the level of mitigation of impacts in relation to the mitigation hierarchy to be included in the associated EMPr.

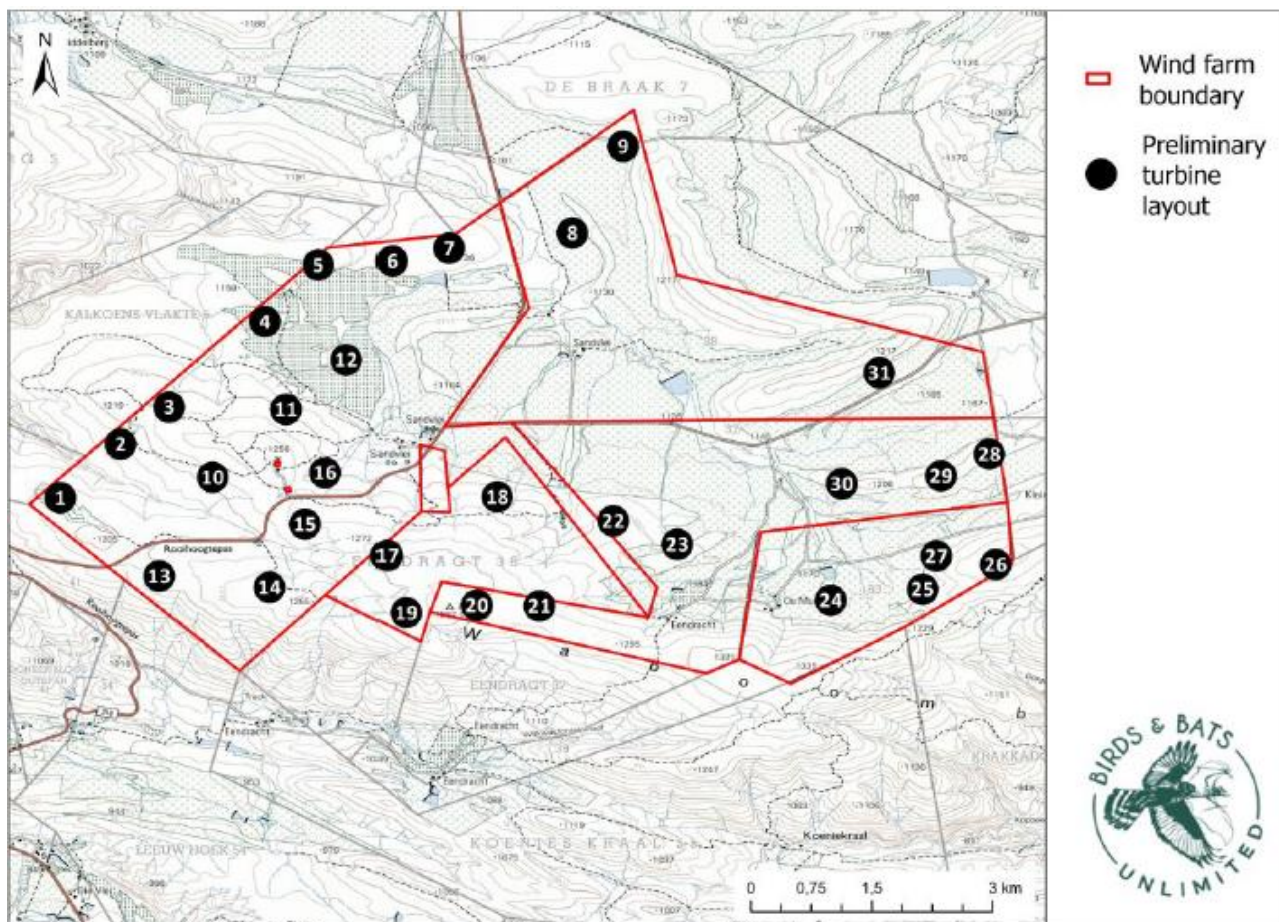
12.6.6 AVIFAUNA

It is important to note that Avifauna monitoring needs to be undertaken over a 12-month period in order to obtain all the necessary information required for both the scoping and EIA phases of the Project. The following plan of study for the Avifaunal Assessment has been underway since January 2022 and was completed in January 2023.

12.6.6.1 PRE-CONSTRUCTION AVIFAUNAL MONITORING PROTOCOL

In accordance with the Best Practice guidelines for assessing and monitoring the impact of WEFs on birds in southern Africa (Jenkins et 2015), four seasonally timed site visits across the entire 4,113 ha study area (Figure 12-1) have been undertaken to record all flights and heights of Priority species.

FIGURE 12-1: THE STUDY SITE (= RED POLYGON) OF THE PROPOSED KHOE WIND FARM, 20-KM SOUTH OF DE DOORNS IN THE WESTERN CAPE. THIS MAP DEPICTS THE PRELIMINARY MAY 2023 TURBINE LAYOUT (BLACK CIRCLES)



All areas are covered, and species flights recorded. Methods for the Vantage Point (VP) monitoring are given in the seasonal Interim Reports, which were undertaken according to the Birds and Renewable Energy Specialist Group (BARESG) monitoring protocols (Jenkins et al. 2015).

Flights of all Priority species were recorded in the field and are undertaken over four equally spaced seasons for the proposed Khoehoe WEF site.

TABLE 12-1: SITE VISITS TO THE KHOE WEF

Iterations	Original Footprint	Extended Footprint
EIA site visit: Summer1	28 to 31 Jan 2022	-
Scoping site visit	7 to 8 Feb 2022	
EIA site visit: Autumn	5 to 8 Mar 2022	23 to 26 Mar 2022
EIA site visit: Winter	1 to 4 Jun 2022	20 to 23 Jul 2022
EIA site visit: Spring	19 to 22 Sep 2022	5 to 8 Oct 2022
EIA site visit: Summer2	-	2 to 5 Nov 2022

Where Black Harriers or Verreaux's Eagle occur the Birdlife South Africa wind energy guidelines for both species (Simmons et al. 2020, Ralston-Paton 2021) recommend:

- The observation hours per VP must increase from 12 hours to 18 hours in each season; and
- Where no additional modelling or GPS-tracking occurs, the monitoring must span 24 months (preferably covering two full breeding seasons).

For all other species the Avifauna survey teams estimated flight height of every collision-prone species in 10 m bands, every 15 seconds – a critical factor in collision risk assessments – as this gives an indication of the risk to birds flying within the blade-swept area. The proposed turbines for the Khoe WEF site have a hub height of 120 m and blade (rotor) length of 81.5 m. Thus, the blade swept area (BSA) for the proposed turbines varies from 38 m to 202 m.

To delineate the risky flight heights of each track recorded we used the 80% quartile (rather than the average height) and the minimum, and maximum, heights.

12.6.6.2 COLLISION RISK MODELLING

CRM, developed by Band et al. (2007), has been used for many years to more precisely assess the risk to birds as they pass through a wind farm environment. More sophisticated models that take uncertainty into account have since appeared (New et al. 2015), fine-tuning the analysis. It is based on a combination of:

- The probability of collision;
- The birds' exposure to turbines (in time and space); and
- A measure of the spatial and temporal extent over which a bird is at risk of collision (the hazardous footprint).

By incorporating uncertainty into the equations, through a Bayesian modelling approach, more realistic estimates of the risk of fatalities are incorporated into the new model (New et al. 2015). The modelling used here has been taken a quantum leap forward by Dr Robin Colyn, as it also incorporates Habitat Suitability Models (HSM), terrain, topography and seasonality.

CRM was used in this study to fine-tune areas where Priority collision-prone species are most likely to impact future wind turbines. This work is only the second time that CRM has been undertaken for an entire wind farm in southern Africa, across a suite of collision-prone species identified on site. It was expertly undertaken by Dr Robin Colyn who co-authors this Basic Assessment Report.

Site Specific Risk Analysis

Time spent in the BSA does not alone predict collision risk. Several other factors could influence collision-risk. For example, increased exposure to a turbine(s) could increase collision risk.

The CRM was taken one step further by including the following inputs:

- Turbine positions available at the time (possible indicator of turbine exposure).
- Conservation status (whereby Red Data species were given a higher weighting than Least Concern Species).
- The turbine collision propensity of individual species derived from empirical data provided from South African Wind Farm fatalities (Perold et al. 2020). More fatalities result in a higher ranking.

The result of this second phase of modelling is a “heat map” of the cluster showing the relationship between collision-risk of all Priority species and the proposed turbine layout. By observing the change in colours across the map, one can gauge the change in collision-risk.

Once the collision-risks had been represented spatially, the next step is to determine which risk classes (colours) were acceptable for development, which required mitigation, and which required avoidance altogether.

Because there are few established thresholds for acceptable impacts on bird species in South Africa, this was mainly based on subjective opinion. However, for some species such as the Black Harrier, we know that the death of three to five more adults per year would send the population to extinction in approximately 75 years (Cervantes et al. 2022). Thus, for such precarious species we set the bar at zero fatalities for Black Harriers.

It is anticipated that similar population viability modelling of other Priority species will allow us to determine thresholds above and below which wind farm developers and specialists can set limits.

12.6.7 BATS

It is important to note that Bat monitoring needs to be undertaken over a 12-month period to obtain all the necessary information required for both the scoping and EIA phases of the Project. The Bat Assessment has been underway since January 2023 and is due to be completed in January 2024.

A preliminary bat sensitivity map was compiled with the available data up to now. The bat sensitivity zones still need to be refined, incorporating data from the whole monitoring year. Correlations between bat data and weather conditions will be included in the final bat monitoring report. Therefore, there will be some changes in sensitivity zones.

12.6.8 SOCIO-ECONOMIC

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the study will involve:

- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds.
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium and high skilled), breakdown of wages per skill level, assessment procurement policies etc.
- Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.

- Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners.
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project.
- Identification and assessment of cumulative impacts (positive and negative).
- Identification of appropriate measures to avoid, mitigate, enhance, and compensate for potential social impacts.
- Preparation of SIA Report.

Interviews will be undertaken with key stakeholders and interested and affected parties during the assessment phase.

12.6.9 HERITAGE AND PALAEOLOGY

It is to be expected that Heritage Western Cape (HWC) will request a Heritage Impact Assessment for the Khoe WEF as part of the EIA. Given the high paleontological sensitivity of the development site, the HIA will need to include at least a desk-based paleontological impact assessment and will probably require a site assessment.

An archaeological site assessment has already been included in the budget for the project and will be undertaken before the HIA is produced.

A comment on the HIA will be required from HWC and any comments received must be considered by the competent authority before issuing an EA.

12.6.10 VISUAL/ LANDSCAPE

Following the establishment of the baseline information pertinent to the development in the Scoping Phase VIA (as undertaken in this report), the primary goal of the EIA Phase VIA report will be to ensure that visual impacts are adequately assessed and considered so that the relevant authorities can decide if the proposed WEF has unreasonable or undue visual impacts. The secondary aim is to identify effective and practical mitigation measures, if possible.

Since the purpose of a VIA is not to predict whether specific individuals or entities will find this type of development (renewable wind energy facility) pleasing or not but instead to identify the important visual features of the surrounding landscape, especially the features and characteristics that contribute to scenic quality, as the basis for determining how and to what degree a particular project will impact on those scenic values. The study will include the following:

1. Refinement of the baseline study, description of the visual character of the sites and zone of visual influence, if required.
2. Adjust the list of identified visual impacts resulting from the proposed development (with consideration of any public and/or relevant authorities' comments), if required.
3. Assessment of visual impacts based on the following VIA rating criteria, namely:
 - a. Quality of the affected environment (landscape) – the aesthetic excellence and significance of the visual resources and scenery.

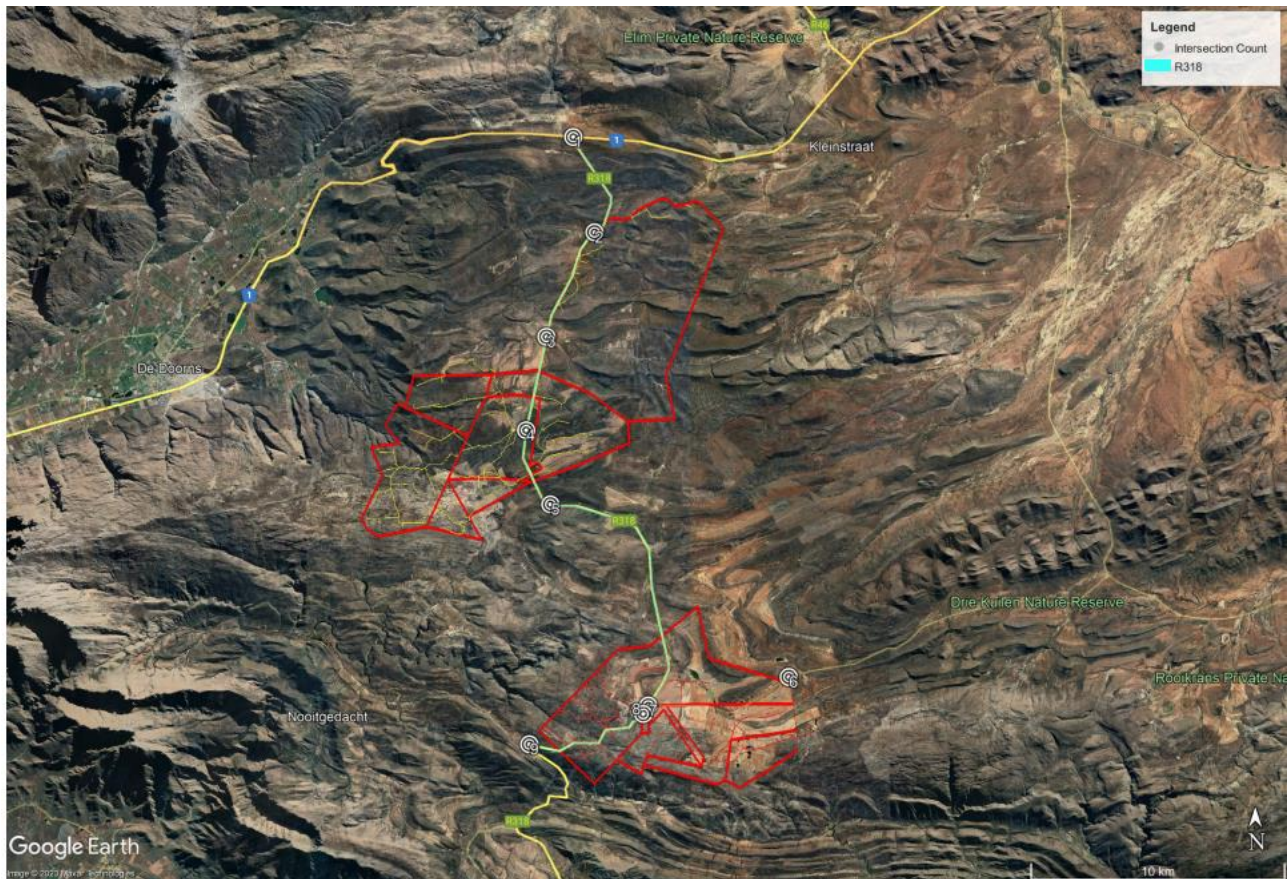
- b. Viewer incidence, perception and sensitivity – the level of acceptable visual impact is influenced by the type of visual receptors.
 - c. Determine the Visual Absorption Capacity (VAC) – the capacity of the receiving environment to absorb the potential visual impact of the proposed development.
 - d. Refine the potential visual exposure (visibility) - the geographic area from which the project may be visible based on any layout changes undertaken between the Scoping and EIA Phase.
 - e. Shadow Flicker Assessment – based on any layout changes undertaken between the Scoping and EIA Phase, determine the affected zone caused when the shadow of an object repeatedly passes or pulsates over the same point in the landscape.
 - f. Determine the cumulative visual exposure - the combined or incremental effects resulting from changes caused by a proposed development in conjunction with other existing or proposed activities.
 - g. Visual Impact Index - the combined results of visual exposure, viewer incidence / perception and visual distance of the proposed facility. Values are assigned for each potential visual impact per data category and merged in order to calculate the visual impact index.
4. Assessment of the significance of the visual impacts, rated according to an agreed upon methodology, which includes:
- a. Extent, duration, magnitude and probability to determine significance; and
 - b. Significance considered with status (positive, negative or neutral) and reversibility (reversible, recoverable or irreversible) following decommissioning of the proposed facility.
5. Impacts will be rated before mitigation and after, assuming mitigation is possible.
6. Development of mitigation measures to reduce visual impacts and enhance any positive visual benefits, where possible.
7. Undertaking of photo simulations (in addition to the spatial analyses) to illustrate the potential visual impact of the proposed facility within the receiving environment.

12.6.11 TRAFFIC

12.6.11.1 DATA COLLECTION REQUIREMENTS

To understand the effects of additional traffic on the road network, an understanding of existing road network traffic conditions is required. Thus 12-hour manual classified traffic counts data should be collected at key intersections around the proposed development. Up to 9 manual classified traffic counts are anticipated. Additional SANRAL CTO station data will be collected to develop an understanding of general traffic patterns along the major road network. Locations of survey intersections are indicated in Figure 12-2 and listed below.

FIGURE 12-2: LOCATIONS OF TRAFFIC COUNTS



12.6.11.2 ACCESS ARRANGEMENTS REQUIREMENTS

An analysis of access routes and site access positions will be re-evaluated based on the final layout of the turbine positions. Site distance assessment will also be included in the evaluation of access, particularly during the construction phase, to ensure safety and its appropriateness. It has been assumed that site access will be gained using existing roads.

12.6.11.3 TRIP GENERATION, ASSIGNMENT AND DISTRIBUTION

Traffic volumes for the construction, operational and decommissioning phases will be estimated based on information received from the client. It is assumed that the client will make information available about the construction, decommissioning and operational approach as well as the preferred origin of vehicles and staff where possible.

12.6.11.4 TRAFFIC IMPACT AND MITIGATION

Base year and forecast year capacity analysis will be undertaken at key local junctions to determine the current traffic operational conditions and the potential impact of the anticipated development trips on the surrounding road network. The analysis will be carried out using SIDRA microsimulation tool to evaluate the level of service and operational performance during the construction, operational and decommissioning phases. Traffic mitigation or management measures, as well as residual impacts for the development will be outlined.

12.6.11.5 UPDATING OF IMPACT SIGNIFICANCE AND RATINGS

An update on the impact of the development on predicted traffic and pavement loading, along with significance ratings will be included. Additionally, the assessment of traffic impacts during

the project lifecycle will inform the EIA phase, where an environmental significance scale will be used to evaluate the importance of a particular impact.

12.6.11.6 UPDATING OF TRANSPORTATION PLAN

An update to the high-level transportation plan for the construction phase will be conducted based on comments and inputs from various stakeholders. This update will involve amongst others a review of origins and destinations of equipment and the transportation route (options) from the point of delivery to the site.

12.6.11.7 CONSULTATION REQUIREMENTS

Consultation with relevant national/provincial/local road authorities is required to ensure approval of the EIA Traffic and Transportation Specialist Assessment. The following authorities will need to be consulted as part of the Impact Assessment procedure:

- SANRAL;
- Western Cape Provincial Roads Department; and
- Langeberg Local Municipality/ Cape Winelands District Municipality.

The extent of consultations will depend on the site selected and whether new access intersections will be required.

12.6.11.8 RECOMMENDATIONS

The final traffic and transportation assessment will outline conclusions and recommendations to mitigate any traffic impacts of the proposed development on road users and surrounding communities.

Where construction of site access/intersections, new external/internal roads or upgrading of existing roads is required, the impact of such related construction activities will be managed and mitigated through traffic control and traffic accommodation measures.



APPENDIX A EAP CV AND DECLARATION OF INDEPENDENCE

APPENDIX CONTENTS LIST





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