Volume I: Final Environmental Impact Assessment Report

Proposed Hugo Wind Energy Facility and associated Infrastructure, Western Cape Province

PREPARED FOR
DFFE Reference:
14/12/16/3/3/2/2515
FINAL FOR DFFE DECISION

DATE
30 September 2024

REFERENCE
0695823

DOCUMENT DETAILS

DOCUMENT TITLE	Volume I: Final Environmental Impact Assessment Report
DOCUMENT SUBTITLE	Proposed Hugo Wind Energy Facility and associated Infrastructure, Western Cape Province
PROJECT NUMBER	0695823
Date	30 September 2024
Version	03
Author	Sadiya Salie, Stephanie Gopaul
Client name	FE Hugo & Khoe (Pty) Ltd

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
1.0	00	Sadiya Salie, Stephanie Gopaul	Stephen Burton	Stephanie Gopaul	05-08-2024	Draft for Client Consideration
2.0	01	Sadiya Salie, Stephanie Gopaul	The Energy Team	Stephanie Gopaul	19-08-2024	Draft for Public Domain
3.0	02	Sadiya Salie, Stephanie Gopaul	The Energy Team	Stephanie Gopaul	27-09-2024	Final Report for DFFE decision

SIGNATURE PAGE

Volume I: Final Environmental Impact Assessment Report

Proposed Hugo Wind Energy Facility and associated Infrastructure, Western Cape Province

0695823

[Double click to insert signature]

Stephanie Gopaul
Partner and Registered EAP

ERM Southern Africa (Pty) Ltd.
1st Floor
Great Westerford
240 Main Road, Rondebosch
Cape Town, 7700
South Africa
T +27 21 681 5400

CONTENTS

APPENDIX B ENVIRONMENTAL MANAGEMENT PROGRAMMES

LIST OF TABLES

LIST OF FIGURES

PROJECT DETAILS

DFFE Reference	**14/12/16/3/3/2/2515**		
ERM Reference	0695823 Hugo Wind Energy Facility		
Project Title	Hugo Wind Energy Facility and associated Infrastructure		
EAP	Stephanie Gopaul	Environmental Resource Management Southern Africa (Pty) Ltd	
Consultant	Sadiya Salie	Environmental Resource Management Southern Africa (Pty) Ltd	
Specialist Team	Soil, Land Use and Agricultural Potential	Johann Lanz	Independent Consultant
	Heritage and Palaeontology	John Gribble	ACO Associates cc
	Noise	Mornè De Jager	Enviro Acoustic Research
	Visual/ Landscape	Lourens du Plessis	LOGIS
	Traffic	Victor de Abreu and Reabetswe Mokomele	SMEC
	Biodiversity	Dr Owen Davies	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	EIA REPORT – Final for DFFE Decision		

ACRONYMS, ABBREVIATIONS AND UNITS

Acronyms	**Description**
AQA	Air Quality Act
BESS	Battery Energy Storage System
BGWMA	Breede-Gouritz Water Management Area
BVM	Breede Valley Municipality
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
CBD	Convention on Biological Diversity
CHSSP	Community Health, Safety and Security Plan

Acronyms	Description
CR	Critically Endangered
CRM	Collision Risk Model
dB	Decibel
DD	Data Deficient
DFFE	Department of Forestry, Fisheries and the Environment (National)
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DHSWS	Department of Human Settlement, Water and Sanitation
EN	Endangered
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
ENIA	Environmental Noice Impact Assessment
ESA	Ecological Support Area
ESA	Early Stone Age
ESMP	Environmental and Social Management Plan
EWT	Endangered Wildlife Trust
FSR	Final Scoping Report
GBIF	Global Biodiversity Information Facility
GHG	Greenhouse Gas
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
HSM	Habitat Suitability Model
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

Acronyms	Description
LC	Least Concern
LN	Listing Notice
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt
NCCAS	National Climate Change Adaptation Strategy
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
NID	Notice of Intent to Develop
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Protected Area Expansion Strategy
NSR	Noise Sensitive Receptor
NT	Near Threatened
NWA	National Water Act, 1998 (Act No. 36 of 1998)
O&M	Operation and Maintenance
PAOI	Project Area of Influence
PES	Present Ecological State
pW	pico Watt
PWL	Sound Power Level
PPP	Public Participation Process
QGIS	Quantum Geographic Information System
RD	Red Data
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
REC	Recommended Ecological Category
REDz	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application
REL	Red List of Ecosystems
S&EIA	Scoping and Environmental Impact Assessment
SABAA	South African Bat Assessment Association
SABAP2	The Southern African Bird Atlas Project
SAHRA	South African Heritage Resources Agency

Acronyms	Description
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEF	Solar Energy Facility
SDOD	Shut-down-on-demand
SIA	Social Impact Assessment
SR	Scoping Report
SSC	Species of Conservation Concern
ToR	Terms of Reference
UNFCC	United Nations Framework Convention on Climate Change
VM	Virtual Museum
VP	Vantage Point
VU	Vulnerable
WCCCRS	Western Cape Climate Change Response Strategy
WDM	Winelands District Municipality
WULA	Water Use License Application

EXECUTIVE SUMMARY

FE Hugo & Khoe (Pty) Ltd ('the Project Applicant') is applying for environmental authorisation (EA) to construct and operate the up to 336 MW Hugo Wind Energy Facility (WEF) and its associated on-site substation and Battery Energy Storage System (BESS) ('the proposed development'). Environmental Resource Management Southern Africa (Pty) Ltd (ERM) has been appointed to act as the independent Environmental 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.

One additional WEF, namely Khoe is concurrently being considered in the surrounding properties and is assessed by way of separate impact assessment processes contained in the 2014 Environmental Impact Assessment (EIA) Regulations (GN No. R982, as amended) for listed activities contained in Listing Notices 1, 2 and 3 (GN R983, R984 and R985, as amended).

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 Hugo WEF is located near De Doorns within the Breede Valley Local Municipality, and Cape Winelands District Municipality in the Western Cape Province.

The proposed Hugo WEF project site is proposed to accommodate infrastructure (as detailed below), which will enable the wind farm to supply a contracted capacity of up to 336 MW. The development footprint of the site will be up to 100 ha, dependent on the sensitivities in the area. The proposed development will comprise of the following infrastructure:

Hugo WEF components:

- Up to 42 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 8 MW.
- A transformer at the base of each turbine.
- Concrete turbine foundations - approximately up to 1,000 m^2 per turbine.
- Each turbine will have a hardstand of approximately up to 7,500 m^2 per turbine.
- Temporary laydown areas (with a footprint of up to 9 ha), which will accommodate the boom erection, storage and assembly area.
- BESS (with a footprint of up to approximately 5 ha).
- Cabling between the turbines, to be laid underground where practical.
- One on-site substation 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 6 m 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 Hugo 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 has been followed.

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

APPLICABLE LISTED ACTIVITIES IN TERMS OF THE NEMA, AS AMENDED

Listing Notice (LN)	**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 Hugo 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);
- Obstacle approval- an obstacle assessment will be undertaken prior to construction; and
- Heritage License in term of the National Heritage Resources Act 25 of 1999.

These permits will be applied for should the project be authorised and be selected as a preferred bidder.

ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The Final Scoping Report (FSR) (ERM, April 2024) presented and assessed the initial proposed wind turbine layout and associated infrastructures of the Hugo WEF and its associated infrastructure. In May 2024, the DFFE accepted the FSR (14/12/16/3/3/2/2515). The results of the specialists' scoping assessments, DFFE comments on the FSR, and other technical and financial constraints for the proposed development site were taken into consideration and a revised 'preferred layout' was produced.

This EIA report presents and assesses the impacts associated with the preferred layout of the Hugo WEF.

SUMMARY OF SPECIALIST ASSESSMENTS RESULTS

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 guidelines and makes use of the experience and expertise of the EAP and the specialists.

Studies have been completed to quantify possible impacts and magnitude of impacts related to but not limited to the soil, land, avifauna, visual/landscape, fauna, flora, aquatic, terrestrial biodiversity, heritage, noise, socio-economic and traffic and transportation and includes measures to mitigate and reduce the significance of impacts.

SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The site is in an area where there is limited crop production. Cropping potential is limited by a combination of climate and soil constraints. The climate is classified as arid and therefore limiting to rain-fed cropping. The dominant soils are shallow soils on underlying weathered bedrock of the Glenrosa, Hutton, Swartland, and Mispah soil forms. There is a high proportion of rock outcrops. 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.

Positive agricultural impacts identified were increased financial security for farming operations and heightened security against theft. Potential negative impacts identified in the study were the occupation of agricultural land from only a very small area. All negative potential impacts were assessed as having low significance as their impact would be very low on future agricultural production. In alignment with the agricultural protocols, it was assessed that agricultural land loss will be within the allowable development limits, ensuring appropriate conservation of production land. The development footprint is roughly eight times smaller than what the development limits allow.

All the key findings substantiates that the assessment of the proposed development's potential negative impact on the agricultural production capability is deemed acceptable for the site, and the receiving environment was verified by the specialist as having overall low to medium agricultural sensitivity. Therefore, from an agricultural point of view, it is **recommended that the development be approved.**

FRESHWATER AND WETLANDS (AQUATICS)

The assessment report was undertaken to meet the criteria to fulfil a Specialist Verification Assessment Report as the proposed site is located within an area rated as very high sensitivity by the DFFE Screening Tool.

The site is situated within the North Langeberg Sandstone Fynbos, Matjiesfontein Shale Renosterveld and Matjiesfontein Quartzite Fynbos vegetation units, all forming part of the Donkies, Hex & Die Brak river catchments. These vegetation units are not listed as a Threatened Ecosystem, by NEMA due to it being considered Endangered.

The area is characterised by low lying drainage areas with alluvial riverine systems, valley bottom wetland areas, mountain catchment areas feed by seepage wetlands and minor watercourses/ drainage lines. Further the area has seen varying degrees of transformation in the form of grazing, as well as the creation of several farm dams, roads and tracks to areas

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) but noting these were mostly terrestrial in nature and associated with the higher lying watercourses that had seen little disturbance.

Using the baseline description, aquatic features were identified, then categorised into one of number pre-determined sensitivity categories to provide protection and/or guide the layout planning processes. The sensitivity ratings of High (No-Go) to Low were determined through an assessment of the habitat sensitivity and related constraints. However, these No-Go areas (with buffers) relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e. existing road crossings within systems), and this is considered acceptable since these areas are already disturbed.

Most of the anticipated impacts would include disturbance during the construction phase. Changes to form and function of the site will be due to increased runoff roads or hard surfaces that would occur in the operational and maintenance (O&M) phase.

The significant impacts are associated with the access road crossings river systems. These systems are generally in a modified state and still provide some habitat and important ecological functions. Mitigation should focus on these areas and include measures to halt erosion and rehabilitate habitat in the sections affected by the construction. Without the implementation of mitigation measures, the project has potential to cause a moderate cumulative impact upon aquatic biodiversity. However, with the adoption of mitigation, the proposed project will have a low impact upon aquatic biodiversity.

The alternative substation / O&M buildings site is located within a high sensitivity area and in very close proximity to a Very High No-Go area, inclusive of the access track. Thus, it is advised that this option is not used and were therefore not assessed further.

Based on the information collected during the field investigations, ratings were verified and upheld for the riverine systems, while some of the systems were rated high (PES = B or C) as they were in a better condition. The high ecological sensitivity rating for the natural water sources was further substantiated by the fact that the affected catchments are considered Critical Biodiversity Areas, Ecological Support Areas, wetlands and rivers. Further, the sites are shown as National Freshwater Ecosystem Priority Area (NFEPA) and Mountain Catchment Areas (Matroosberg).

Mitigation should focus on these areas and include measures to halt erosion and rehabilitate habitat in the sections affected by the construction. Without the implementation of mitigation measures, the project has potential to cause a Moderate cumulative impact upon aquatic biodiversity. However, with the adoption of mitigation, the proposed project will have a Low impact upon aquatic biodiversity. This is inclusive of the potential impacts on the Matroosberg Mountain Catchment, which is protected due to its contribution to the water resources linked to this catchment. However, as the number of turbines and resultant footprint in relation to the catchment, coupled to proper stormwater management, it is anticipated that no alteration / diversion of any hydrological regimes at a catchment scale will occur. This is substantiated by the fact, that specialist, whom has also assisted with restoration / rehabilitation efforts on 19 Wind farms during and after construction, has not observed any hydrological regime changes, with only minor impacts occurring on a site scale within a small number of crossings. Thus any of the proposed mitigations for this and other projects has been sufficient to protect local surface water resources.

Considering the impacts that were assessed, there is no objection to the authorisation of this project, assuming all mitigations and buffer zones are implemented.

TERRESTRIAL BIODIVERSITY

The site is predominantly classified as Very High Sensitivity by the DFFE Online Screening Tool (ST), while remaining areas are classified as Low Sensitivity. This is due to the intersection of the Project Area of Influence (PAOI) with various important biodiversity areas including PAs such as the Matroosberg Mountain Catchment Area, Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Freshwater Ecosystem Priority Areas (FEPAs) and Strategic Water Source Areas (SWSAs).

Up to 586 animal species are potentially present on site, of which 40 are Species of Conservation Concern (SCC). However, some of the occurrence data is likely collected from individuals reintroduced to game reserves. Up to 1,777 plant species are potentially present on site, of which 37 are confirmed SCC according to the DFFE Online ST. Given the high number of species potentially present it is likely the number of SCC is greater than that provided by the DFFE Online ST. The proposed development area includes four vegetation types that are listed as Least Concern (LC) by the Red List of Ecosystems (RLE) and intersects in some areas with Protected Areas (PA), Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA) and Other Natural Areas (ONA).

The anticipated impacts include vegetation clearing, loss of individual SCC, alien invasive species, soil erosion, chemical contamination, fire, reduced and restricted movement, altered flow regimes, disturbance and/or displacement, and mortality. Cumulative impacts include those that affect broad-scale ecological processes. With adherence to the prescribed mitigation measures, opportunities exist to promote conservation efforts, community engagement and education, and local environmental monitoring and research.

It is the Specialists opinion that the DFFE Online ST Assessment of very high Sensitivity in the Terrestrial Biodiversity Theme for some areas is accurate. High sensitivity areas are predominantly those listed as CBAs. All other areas are either medium sensitivity or low sensitivity.

It is the specialist's opinion that the proposed Hugo WEF may be considered for development, provided all mitigation measures are adhered to.

FAUNAL

Two non-avian Species of Conservation Concern were identified as relevant sensitivity features in the animal species theme output of the Screening Tool, namely the Least Concern Caledon Copper (*Aloeideas caledoni*, a butterfly) and Critically Endangered Riverine Rabbit (*Bunolagus monticularis*), both listed as 'medium' sensitivity indicating the potential to occur on the study sit.

Two additional non-avian animal SCCs were determined relevant to the proposed development, namely the Vulnerable Leopard (Panthera pardus) and Near Threatened Grey Rhebok (*Pelea capreolus*).

A camera trap survey was conducted at 11 sampling locations in and around the proposed development area between 17 February 2022 and 23 December 2022, resulting in 1,832 camera trap days. A total of 2,778 independent records of 3,269 animals representing 66 species were recorded across the study area, including 63 records of Riverine Rabbit and 46 records of Grey Rhebok confirmed on site, while Caledon Copper and Leopard were not confirmed on site, both were assumed to be present for the purposes of the assessment. Riverine Rabbit was regularly recorded at three sampling locations placed in natural/near-natural vegetation and recovered vegetation on previously modified land.

The animal sensitivity of the site was mapped through consideration of existing impacts, potential impacts of the proposed development and important ecological processes that should be acting across the site and broader area. Conservation objectives for all animal SCCs relevant to the project highlight the importance of dispersal corridors across the landscape to maintain genetic diversity and long-term studies on population dynamics.

Impacts can be minimized through in-situ biodiversity rehabilitation, specifically through the restoration of strategic, currently modified areas to improve habitat connectivity for animal SCCs relative to the present condition.

Valuable research on animal SCCs can be achieved simultaneously with improvements to ecological connectivity through the establishment of long-term monitoring programmes in the study area.

The proposed development is acceptable from an animal perspective on condition that strategic areas of existing agricultural land be appropriately rehabilitated.

FLORA

The site is predominantly classified as Medium Sensitivity by the DFFE Online Screening Tool (ST), while remaining areas are classified as Low Sensitivity. Up to 1,777 plant species are potentially present on site, of which 37 are listed as SCC by the DFFE Online ST. Given the high number of species potentially present it is likely the number of SCC is greater than that provided by the DFFE Online ST. The proposed development area includes four vegetation types that are listed as LC by the RLE and intersects in some areas with PA, CBA, ESA and ONA.

The anticipated impacts include vegetation clearing, loss of individual SCC, alien invasive species, soil erosion, chemical contamination, and fire. Cumulative impacts include those that affect broad-scale ecological processes and conservation objectives. With adherence to the prescribed mitigation measures opportunities exist to promote conservation efforts, community engagement and education, and local environmental monitoring and research.

It is the Specialists opinion that the DFFE Online ST Assessment of Medium Sensitivity in the Plant Species Theme for some areas is accurate. High sensitivity areas are predominantly those listed as CBAs. All other areas are either medium sensitivity or low sensitivity.

It is the specialist’s opinion that the proposed Hugo WEF proceed to development, provided all mitigation measures are adhered to.

AVIFAUNA

The main surveys were conducted over a 12-month period between 2022-2023. The Hugo site is approximately 8,184 ha in size and comprised mainly highland areas in the north and east with agricultural areas centrally placed and small ridges west of them.

The DFFE Screening Tool (Animal Theme) classified the area as of High Sensitivity (based on the presence of three Red Data species). Birdlife South Africa’s national Avian Sensitivity Map suggests low to medium-high sensitivity for birds and wind energy facility. Inspection of the national bird atlas data set (The Southern African Bird Atlas Project (SABAP2)) including our own species records indicates 206 species recorded, of which 21 are Priority species, of which 10 are Red Data (RD) species. We, thus, concur with the Screening Tool’s assessment that the site is of High Sensitivity, and the data and Collision Risk Models that follow allow us to reduce risk by constructing a detailed spatial picture of the risks to the Priority birds present.

Over four seasons, 349 flights of 17 Priority species were recorded in 965 hours of observations across the proposed Hugo farm (giving a Passage Rate of 0.36 flights per hour). The Collision Risk Modelling (CRM) based on the new Bayesian approach (New et al. 2015) calculates risk classes across all areas of the farm based on the volume of flights, flight heights and their duration, turbine placements and incorporates an assessment of topographic and environmental factors.

Of the 17 Priority species, four (of the 8) Red Data species recorded (Black Harrier (BH), Martial Eagle (ME), Verreaux's Eagle (VE), and Blue Crane (BC)), and two (of the 8) Least Concern species recorded (Jackal Buzzard (JB) and Booted Eagle (BE)) had sufficient data to calculate risk areas and fatalities.

The highest risk areas (Class 5.0 and above) were clumped in the south-western sections but also scattered throughout. The risky threshold chosen (Class 5.0+) encompassed more than 60% of risky flights for three species (Verreaux's Eagle (83%), Lanner Falcon (100%), and Martial Eagle (62%)), and 50% of such flights for Black Harrier (52%). The areas are classified as too risky for development and allocated as No-Go areas.

These high-risk class areas covered 44% of the area, leaving 56% of the area classified as medium or low risk to the Priority birds recorded throughout the study site. Turbines in areas classified as risk Class 4.5 require one-tier of mitigations: patterned blade to increase visibility and Shut-down-on-demand (SDOD) – automated, or human-led, can also be used. Those in Class 4.0 require no additional mitigation, unless fatality rates trigger additional protocols.

By avoiding the risk areas mapped in the spatially explicit model and micro-siting the turbines well away from high-risk areas, fatality estimates can be reduced for all Red Data species to ~0.05 birds/year for Black Harrier, ~0.09 birds/yr Blue Crane, and 0.05 birds/year Verreaux's Eagle. For the Martial Eagle this will be even lower at ~0.01 birds/year. For the Least Concern species Jackal Buzzard and Booted Eagle, fatalities are expected to be ~0.2 birds/year.

According to available information consulted during this study to date, **there are no fatal flaws which should prevent the wind farm from proceeding (assuming all mitigation measures will be implemented) from an avifaunal sensitivity perspective**.

BATS

Data from passive monitoring systems, fieldwork sessions, roost surveys, and a desktop study informed this report. Six static SM4BAT systems were deployed within the project site, with four systems located near-ground at 10 m, to represent the various biotopes, and two on the met mast, within the sweep of the turbine blades, at 50 m and 100 m.

The proposed wind farm falls within the distributional ranges of six bat families and approximately 12 bat species.

Of the 12 species with distribution ranges that include the proposed development area, three have a conservation status of Near Threatened in South Africa and one Vulnerable, while two have a global conservation status of Near Threatened. According to the likelihood of fatality risk, as indicated by the latest pre-construction bat guidelines six species, namely *Miniopterus natalensis* (Natal long-fingered bat), *Tadarida aegyptiaca* (Egyptian free-tailed bat), *Sauromys petrophilus* (Roberts's flat-headed bat), *Laephotis capensis* (Cape roof bat) and the two fruit bats namely; *Eidolon helvum* (African straw-coloured fruit bat) and *Rousettus aegyptiacus*

(Egyptian fruit bat) have a high risk of fatality, while *Myotis tricolor* (Temminck's myotis) bat has a medium-high risk and the endemic *Eptesicus hottentotus* (Long-tailed house) bat has a medium risk of fatality.

Passive monitoring was undertaken between 30 December 2022 and 7 March 2024. *Tadarida aegyptiaca* was the most abundant species recorded (53%), while 38% of the calls were related to *Laephotis capensis*. 4% of the overall activity recorded was similar to *Miniopterus natalensis*, 4% was *Sauromys petrophilus*, and 1% of the *Eptesicus hottentotus*. Apart from *Eptesicus hottentotus*, with a medium risk of fatality, all these species are bats that tend to fly at high altitudes resulting in a high risk of collision or barotrauma from the wind turbines.

The average monthly activity shows that bats are generally most active during the summer months, followed by autumn and spring, with reduced activity during the winter months. Peak activity was recorded in March, April and October 2023, with general high activity from February 2023 to May 2023, and again from October 2023 to March 2024.

Due to the general high bat activity on site, the development areas were classified as medium sensitive. It will therefore be necessary to mitigate turbines early in the operational phase. No turbine components are allowed in high-sensitivity zones. At present no turbines are positioned in medium-high sensitivity zones either, but if turbines are placed in medium-high sensitivity zones, curtailment will have to be applied after the testing of those turbines, when they start to turn.

The overall potential negative impact of the proposed Hugo WEF on bats, combined for all the development phases, is predicted to be moderate negative without mitigation, while low negative with mitigation.

Based on the findings of the 14 months of pre-construction bat monitoring undertaken at the proposed Hugo WEF project site, the bat specialist is of the opinion that no fatal flaws exist which would prevent the construction and operation of this wind farm, however bat activity is high for the monitoring period and mitigation measures should be adhered to. **The EA may be granted, subject to the implementation of the recommended mitigation measures.**

HERITAGE AND ARCHAEOLOGY

The project area is situated in semi-arid, rolling hilly terrain at the extreme western end of the Langeberg Range of the Cape Fold Mountains. The project site contains a mix of hills in the east and centre, and more mountainous terrain in the west above the Hex River Valley.

The most notable archaeological occurrence was an open scatter of late Earlier/early Middle Stone Age lithics found eroding out of the red alluvium in a deflating, unvegetated area next to a gravel road on the farm Helpmekaar. This site will not be affected by the current layout of the WEF.

The low archaeological signature of the Hugo WEF area is in part due to the geology of the area where caves and rock shelters are rare. It is also the result of the exposed high ground where much of the Hugo WEF infrastructure will be placed, and which is unlikely to have attracted more than passing prehistoric human use and occupation and where the presence of archaeological sites and material is the exception rather than the rule.

The Heritage Impact Assessment (HIA) comprised an archaeological site visit and impact assessment of the proposed development site and a desk-based paleontological impact assessment (PIA). As requested by Heritage Western Cape (HWC) in their response to the Notice of Intent to Develop (NID), the results of the visual impact assessment were considered in the HIA. The results of these studies have been integrated into the HIA which assesses the impacts of the project on heritage resources.

It is recommended that the **Hugo WEF be approved**, subject to the recommended mitigation measures.

PALEONTOLOGY

The paleontological assessment indicates that the proposed Hugo WEF is underlain by several coastal to shallow marine formations of the Table Mountain and Bokkeveld Groups of the Cape Supergroup, of Early to Middle Devonian age (*c*. 410 – 390 Ma), some of which have fossils preserved within them.

According to SAHRA's palaeo-sensitivity map, the Hugo WEF footprint is in an area of generally very high or high paleontological sensitivity. However, a paleontological assessment for the adjacent previously proposed 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 that project area is much lower than indicated on the SAHRA map.

There has been little previous archaeological research around the proposed Hugo WEF and desktop information available for the report was limited to a small number of previous archaeological assessments in the region.

It was assumed prior to the site visit that Stone Age resources in and around the Hugo WEF would be rare. This was confirmed by the archaeological site visit in April 2024 which found very little pre-colonial archaeological material and only a couple of colonial period sites within the area that will form part of the Hugo WEF development footprint. There is a moderate to small chance that fossils may occur in the mudstones of the Ceres Subgroup that lie below the soils or in rocky outcrops.

A PIA was commissioned from Dr Marion Bamford of the University of the Witwatersrand as part of the HIA (Bamford, 2024).

The PIA makes the following recommendation:

- A Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the Environmental Control Officer (ECO) or other responsible person once excavations have commenced, they should be rescued and a palaeontologist called to assess and collect a representative sample, unless HWC recommends and alternative approach.

The impact on the paleontological heritage would be moderate to low but the impact can be mitigated by a paleontologist or ECO collecting and removing any important fossils. **There are therefore no objections on paleontological heritage grounds to authorisation of the proposed development**.

VISUAL/LANDSCAPE

Overall, the significance of the visual impacts associated with the proposed Hugo Wind Energy Facility is expected to be very high to high as a result of the generally undeveloped character of the landscape and its inability to absorb changes of this magnitude. Additionally, the facility would be visible within an area that contains certain sensitive visual receptors who already consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along the national, arterial and secondary roads, as well as, residents of rural homesteads and tourists passing through or holidaying in the region.

Night time impacts have also been assessed whereby it was determined that the significance of lighting (particularly aircraft warning lighting mounted on the turbines) on the nightscape would be high post mitigation. As discussed, the greater environment is largely natural in character with limited built infrastructure. Unblemished night skies are a key attribute to the study areas sense of place and nighttime visual character. Light sources in the area are limited to isolated farm and homesteads and fleeting light from passing cars travelling along the R318 and other secondary roads. Therefore, the introduction of new light sources into a relatively dark night sky, will have an impact on the visual quality of the study area at night.

According to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

1. Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of the stakeholders and decision-makers to be unacceptable.

In terms of the above and to the knowledge of the author the proposed development is compliant with all Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites, as well as, conditions of existing Records of Decisions. However, it must be noted that as per the *Guideline for the Management of Development on Mountains, Hills and Ridges of the Western Cape (April 2002),* development on the crest of a mountain, hill or ridge will be strongly discouraged.

Furthermore, with regards to point 3 above, it has been established through the course of this assessment that many objections to the proposed Hugo WEF have been received by stakeholders within the region, as communicated by the EAP and social impact specialist. It should be noted that certain stakeholders also indicated that they ok with the WEF in principle (personal communication with the social specialist). Therefore, with the information available to the specialist at the time of writing this report, it cannot be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, the specialist reserves the right to revise the statement below.

In spite of the predominantly very high to high residual ratings and the likelihood that the proposed development will be met with concern and objections from some of the affected sensitive receptors and landowners in the region, this report cannot categorically state that any of the above conditions were transgressed. As such these visual impacts are not considered to be fatal flaws for a development of this nature.

The proposed Hugo Wind Energy Facility will only be supported from a visual perspective if the mitigation measures are implemented, the layout adjusted accordingly and all best practice mitigation measures, as provided in this report are implemented and adhered to.

EAP Motivation

According to the visual assessment, landowners/receptors and travelers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective. We have considered the responses from all Interested and Affected Parties (I&APs). In response, detailed simulations and visualisations were undertaken from various guesthouses to understand and address potential visual impacts. Adjustments to turbine placement was made based on the outcome of the visual impact assessment. Despite these efforts, some opposition persists.

The turbines located in high sensitivity areas (WTG 1, 2, 3, 9, 10, 11, 12, 18, 19, 21, 23, 27 and 28) are positioned there to take advantage of the optimal wind resource. Relocating or removing these turbines would render the project unfeasible and undermine its support for the green economy strategy and the just energy transition. Furthermore, turbines can be made less visible through surrounding vegetation and the layout of terrain.

I would also like to highlight the proposed Exemia game reserve (where the objections persist). Currently, the proposed campsite area remains undeveloped, and no concrete plans have been provided, so it is considered a future intent project.

The turbines located in the Matroosberg Mountain Catchment Area (WTG 1, 2, 9, 10, 11 and 12) will have a low impact on the Matroosberg Mountain Catchment if all mitigation measures are implemented. This Catchment Area is protected due to its contribution to the water resources linked to this catchment. However, as the number of turbines and resultant footprint in relation to the catchment, coupled to proper stormwater management, it is anticipated that no alteration / diversion of any hydrological regimes at a catchment scale will occur. This is substantiated by the fact, that the aquatic specialist, whom has assisted with restoration / rehabilitation efforts on 19 Wind farms during and after construction, has not observed any hydrological regime changes, with only minor impacts occurring on a site scale within a small number of crossings. Thus, any of the proposed mitigations for this and other projects has been sufficient to protect local surface water resources.

Although the wind farm's visual impact on residents and tourism is high, the decision to proceed with its development is motivated by its considerable environmental and economic benefits. The project will contribute to the aforementioned frameworks, Western Cape Green Economy Strategy and Just Energy Transition and this transition is important to the country and to the future growth and sustainability as an organisation.

The establishment of the Wind Energy Facility will contribute to South Africa's decarbonization efforts while simultaneously generating employment opportunities, leading to improved economic growth. The nearest rural community is approximately 7.5 km from the proposed wind farm site. The development of the wind farm is expected to boost the local economy by creating job opportunities and supporting local businesses.

Additionally, traffic mitigation measures will be enforced to minimize disruptions for local residents and tourism activities, ensuring that the overall benefits of the wind farm outweigh the challenges.

NOISE

A full environmental impact assessment was conducted because the project area was rated as having a potentially high sensitivity to noise. The surroundings of the project focus area are sparsely populated with a few noise-sensitive developments. Most dwellings featuring in the vicinity of the project focus area are scattered in a heterogeneous fashion, typical of a rural farming area. Croplands, animal husbandry and limited residential activities (farmers and workers with their families) are predominant in the study area.

The closest potential noise-sensitive receptors are residential areas. These noise receptors were identified using aerial imagery as well as a physical site visit. Methodology used by the specialist aimed to measure ambient sound levels. Ambient sound levels were measured in the vicinity of the project area in a semi-continuous manner over a period of 7-nights in December 2022 and again over 4-nights during September 2023 (resulting in approximately 4,000 daytime and 2,000 night-time measurements – each with a duration of 10-minutes). The highest fast-weighted sound level measured for daytime activities was more than 75 decibels A (dBA) and the lowest level was less than 20 dBA. Measurements collected at night-time periods reported the highest fast-weighted sound level of more than 75 dBA and the lowest sound level was less than 20 dBA. Average sound levels for daytime fast-weighted sound levels are 54.9 dBA and night-time fast-weighted sound levels are 47.8 dBA.

Acceptable noise limits for daytime is 45 dBA with a maximum noise limit of 52 dBA. Night-time rating levels is reported as 35 dBA with a noise limit of 42 dBA. These limits are typical of a rural noise district.

The applicant should develop and implement an environmental noise monitoring programme at selected Noise Sensitive Receptors (NSR) living within the 42 dBA noise contour.

From an acoustic perspective the turbine layout is considered acceptable should the applicant select to use a turbine model with a sound pressure level (SPL) less than 109.2 dBA (re 1 pico Watt (pW)) and it is **recommended that the Hugo WEF be authorised**.

SOCIO-ECONOMIC

The findings of the SIA indicate that the proposed Hugo WEF project will create a number of 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.

However, the Hugo WEF will have a negative visual impact on the areas sense of place. Based on the findings of the VIA, the impact on sense of place is rated as high negative. Effective mitigation to reduce the significance of the impact is not achievable. Concerns relating the potential visual impact of the proposed Hugo WEF on the areas sense of place and tourist related activities were raised by several landowners.

The impact of the Hugo WEF on tourism activities was rated as medium negative with and without mitigation. Mitigation will not be possible to reduce this significance rating and this represents a negative externality for which the affected owners may potentially suffer a financial loss in the event that the presence of the turbines causes a reduction in the realisation of the expected tourism potential. While this loss may be offset by some form of compensation, given the areas visual sensitivity and number of established nature reserves and associated eco-tourism facilities, the overall suitability of the area from a visual perspective, is a concern. The cumulative impacts are rated as very high negative which heightens the concern.

It is of the specialist opinion that the suitability of establishing large WEFs, including the proposed Hugo WEF, in the area to the south of the N1 is questioned. The development of renewable energy facilities in this area represents a spillover from the Komsberg REDZ located to the north of the N1. From a long-term planning perspective this may not be ideal, specifically given the environmental and scenic qualities of the area. In this regard the Western Cape Provincial Spatial Development Framework highlights the importance to the Province’s landscape and scenic assets and threat posed by large scale infrastructural developments such as wind farms.

EAP Motivation

According to the visual assessment, landowners/receptors and travelers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective.

As mentioned above, the Western Cape Provincial Development Framework Western Cape’s cultural and scenic landscapes are significant assets that underpin the tourism economy, however according to the key Provincial climate change challenge, the plan is to devise and introduce effective adaptation and mitigation responses, especially for vulnerable municipalities. One of the focus areas for mitigation is renewable energy, which is directly applicable to this Project application. Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations.

Furthermore, with load shedding costing South Africa’s economy R500 million per stage, per day and the Western Cape’s economy R75 million per stage (according to BusinessTech 2021), the country’s energy crisis, needs large-scale private sector participation, in partnership with government. This will be key in addressing the current shortfall in the Western Cape.

To accelerate the decarbonisation of South Africa’s economy and support economic growth, government from South Africa, France, Germany, the United Kingdom and the United States, along with the European Union announced a long-term Just Energy Transition Partnership in November 2022.

The Western Cape Climate Change Response Strategy (WCCCRS) was adopted in February 2014. The strategy is an update of the 2008 Western Cape Climate Change Response Strategy and Action Plan. The key difference with the 2008 Strategy is a greater emphasis on mitigation, including strategically suitable renewable energy development. The development of the WEF will contribute to national and global efforts to significantly reduce Green House Gas (GHG) emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions.

Given the aforementioned framework and the Western Cape Green Economy Strategy, the establishment of this Wind Energy Facility will contribute to South Africa's decarbonization efforts while simultaneously stimulating development and generating employment opportunities, leading to improved economic growth.

The developer has taken into account the visual impact findings and has revised the layout multiple times to minimize visual impacts. However, the specific turbines which are located in high sensitivity areas are positioned there to take advantage of the optimal wind potential. Relocating or removing these turbines would render the project unfeasible and undermine its support for the green economy strategy and the just energy transition, bearing in mind that this transition is important to the country and to the future growth of the renewables sector.

TRAFFIC AND TRANSPORTATION

The Traffic Impact Assessment (TIA) compiled for the Hugo WEF assesses the impacts on the existing road network within the study area during the construction, operation and decommissioning phases. The assessment follows appropriate guidelines and protocols for technical appraisal.

The extent of the study area covers key routes and intersections within a 10 km radius near the development on which the expected traffic generated by the development may have a significant impact. Thus, the following intersections were included in the study area:

- Intersection 1: N1 and R318 (MR00295);
- Intersection 2: R318 and DR01442 (Road to Matroosbergstasie);
- Intersection 3: R318 and OP05749 (Road to Uitsig); and
- Intersection 4: R318 and OP05748 (Road to Middelberg Guest Farm).

To understand the effects of additional traffic on the road network, an understanding of existing road network traffic conditions was required. Thus 12-hour manual classified traffic counts were conducted at four (4) key intersection. These traffic counts were carried on Monday, 15 April 2024 between 06h00-18h00.

The volume of traffic on the Main Road R318 is relatively low compared to traffic volumes along the N1 National Road. Similarly, all other roads (Road DR01442, Road OP05749 and Road OP05748) carry very low traffic volumes compared to both Main Road R318 and the N1 National Road.

Trips generated during the construction phase will primarily comprise of transporting equipment, turbine components, personnel, construction, and other facility materials comprising of normal, heavy, and abnormal load vehicles. It is expected that the construction phase will have the highest traffic impact of all the phases.

Another contributor to trips generated to the site will be daily commuters/workers expected during construction. It has been assumed that a total labour force of approximately 200 -250 workers will be required during construction. Most of the labour force is expected to be sourced from towns in close proximities such as De Doorns, Worcester, Touws River with the remainder coming from other areas such as Montagu.

The operational phase is expected to have comparatively minimal traffic impact as the only transport required will be associated with monitoring, operation, and maintenance.

For the decommissioning phase, about 360 people will be needed with similar transport as the construction phase. All parts will be either reused or recycled and would most likely make their way back to the applicable Port. The decommissioning phase is expected to generate the second highest traffic impact after construction as a result of the need to remove the infrastructure and rehabilitate the site.

The base year and forecast year road capacity has indicated that the proposed development will have little to no significant impact on the existing road network capacity and intersection operational performance.

Given the findings of the TIA, it is recommended that the proposed development be considered favourably from a traffic engineering point of view as the intended construction will have no significant negative impact on the surrounding road network. **The project can be considered for environmental authorisation.**

WAKE EFFECT ANALYSIS

A wake effect impact analysis was not needed for the project as there are currently no surrounding operational nor proposed wind farms within 30 km radius.

SPECIALIST IMPACT TABLE SUMMARY

CONSTRUCTION PHASE IMPACTS

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Freshwater & Wetlands (Aquatics)								
Spread of Alien Vegetation	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Loss of habitat/vegetation	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Loss of Critical Biodiversity Areas (CBAs)	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Partly Reversible	Negative	Low	Low Probability	Low
Loss of riparian habitat	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Changes to the hydrological regime and	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
increase potential for erosion	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Changes to surface water quality	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Terrestrial Biodiversity								
Potential vegetation clearing	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low
Potential chemical contamination	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Medium
Reduced connectivity and restricted movement of fauna	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low
Potential altered flow regime	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Potential disturbance and/or displacement	Without Mitigation	Regional	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Moderate
Potential mortality of faunal and flora species	Without Mitigation	Local	Long term	Irreversible	Negative	High	Highly Probable	Very High
	With Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Probable	High
Faunal								
Direct habitat loss	Without Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Highly Probable	Moderate
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Highly Probable	Moderate
Indirect habitat loss	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Highly Probable	Moderate
Displacement or disturbance	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Moderate

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Direct Mortality	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	High
Indirect Mortality	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	High
Impacts of all phases of the proposed development on ecological processes of the area	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Probable	High
Avifauna								
Displacement of Priority species	Without Mitigation	Site	Short term	Irreversible	Negative	Moderate – High	Highly likely	High
	With Mitigation	Site	Short term	Reversible	Negative	Moderate	Probable	Medium - High
Bats								
Clearing and excavation of natural habitat	Without Mitigation	Local	Short term	Recoverable	Negative	Moderate	Definite	Moderate
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Creating attractive bat habitat within the development terrain	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Highly probable	Moderate
	With Mitigation	Site	Short term	Reversible	Negative	Low	Low probability	Very Low
Construction noise	Without Mitigation	Local	Short term	Reversible	Negative	Moderate	Definite	Low
	With Mitigation	Site	Short term	Reversible	Negative	Low	Definite	Very Low
Archaeology, Paleontology and Heritage								
Disturbance or destruction of archaeological sites and/or materials	Without Mitigation	Local	Permanent	Irreversible	Negative	Low	Low Probability	Low
	With Mitigation	Local	Permanent	Irreversible	Negative	Low	Low Probability	Very Low
Disturbance or destruction of fossil material	Without Mitigation	Local	Permanent	Irreversible	Negative	Low	Low Probability	Low
	With Mitigation	Local	Permanent	Irreversible	Negative	Low	Low Probability	Very Low
Disruption of the cultural landscape due to the presence of construction equipment and activity	Without Mitigation	Local	Long term	Irreversible	Negative	High	Definite	High
	With Mitigation	Local	Long term	Recoverable	Negative	Moderate	Definite	Moderate
Visual								

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Visual impact of construction activities on residents of homesteads and visitors to tourist accommodation within 5 km to the proposed WEF	Without Mitigation	Very short distance	Short term	Reversible	Negative	Very High	Highly Probable	Very High
	With Mitigation	Very short distance	Short term	Reversible	Negative	Very High	Probable	High
Visual impact of construction activities on observers travelling along roads within 5 km of the proposed WEF	Without Mitigation	Very short distance	Short term	Reversible	Negative	Moderate	Highly Probable	Very High
	With Mitigation	Very short distance	Short term	Reversible	Negative	Moderate	Probable	High
Noise								
Construction of Access Roads	Without Mitigation	Local	Temporary	High	Negative	Moderate	Likely	High
	With Mitigation	Local	Temporary	High	Negative	Low	Possible	Moderate
Construction Traffic Noises	Without Mitigation	Local	Short term	High	Negative	Low	Possible	Low
	With Mitigation	Local	Short term	High	Negative	Low	Possible	Low
Daytime WTG construction	Without Mitigation	Local	Short term	High	Negative	Low	Improbable	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
	With Mitigation	Local	Short term	High	Negative	Low	Improbable	Low
Night-time WTG construction	Without Mitigation	Regional	Short term	High	Negative	Moderate	Likely	Very High
	With Mitigation	Regional	Short term	High	Negative	Low	Possible	High
Socio-economic								
Creation of employment and business opportunities	Without Mitigation	Local-Regional	Short term	n/a	Positive	Moderate	Probable	Moderate
	With Mitigation	Local-Regional	Short term	n/a	Positive	Moderate	Highly Probable	Moderate
Impact of construction workers on local communities	Without Mitigation	Local	Short term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Low
Influx of job seekers	Without Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Low
	With Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Without Mitigation	Local	Short term	Reversible	Negative	Moderate	Probable	Medium
	With Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Low
Increased risk of grass fires	Without Mitigation	Local	Short term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Short term	n/a	Negative	Low	Probable	Low
Nuisance impacts associated with construction related activities	Without Mitigation	Local	Short term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Short term	n/a	Negative	Low	Probable	Low
Loss of farmland	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Short term	Reversible	Negative	Low	Highly Probable	Low
Traffic and Transportation								
Increased Traffic	Without Mitigation	Regional	Short term	Recoverable	Negative	Low	Probable	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
	With Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Very Low
Increase in abnormal traffic volumes	Without Mitigation	National	Short term	Recoverable	Negative	Moderate	Probable	High
	With Mitigation	National	Short term	Recoverable	Negative	Moderate	Probable	Moderate
Impact of dust along gravel site access roads	Without Mitigation	Site	Immediate	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low
Deterioration of surrounding road network	Without Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low

OPERATION PHASE IMPACTS

Operation Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
Freshwater and Wetlands								
Potential spread of Alien vegetation	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Terrestrial Biodiversity								

Operation Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Potential habitat fragmentation impacts	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Low	Probable	Medium
Potential encroachment of alien invasive species resulting in loss of flora	Without Mitigation	Local	Long term	Irreversible	Negative	High	Definite	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
Potential light, noise and visual impacts	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Low	Probable	Medium
Potential fire	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Low	Probable	Medium
Potential faunal mortality and loss of SCC	Without Mitigation	Local	Long term	Irreversible	Negative	High	Definite	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
Soil erosion	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Medium term	Recoverable	Negative	Low	Probable	Medium
Faunal								
Direct habitat loss	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Highly Probable	High

Operation Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
	With Mitigation	Local	Long term	Recoverable	Negative	Low	Low Probability	High
Indirect habitat loss	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Long term	Recoverable	Negative	Low	Low Probability	High
Disturbance/displacement	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Long term	Reversible	Negative	Low	Low Probability	High
Direct Mortality	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Long term	Reversible	Negative	Low	Low Probability	High
Indirect Mortality	Without Mitigation	Site	Long term	Irreversible	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Long term	Recoverable	Negative	Low	Probable	Low
Avifauna								
Bird collision with turbine blades, habitat alteration and displacement	Without Mitigation	Site	Long term	Reversible	Negative	High	Highly Likely	High
	With Mitigation	Site	Long term	Reversible	Negative	Moderate - High	Probable	Moderate - High
Bats								

Operation Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
Direct collision or barotrauma	Without Mitigation	Regional	Indefinite	Irreversible	Negative	High	Definite	High
	With Mitigation	Regional	Long term	Recoverable	Negative	High	Definite	Moderate
Fatality of migrating bats	Without Mitigation	National	Long term	Recoverable	Negative	Moderate	Probable	Moderate
	With Mitigation	National	Long term	Recoverable	Negative	Low	Low probability	Low
Loss of bats of conservation value	Without Mitigation	Regional	Long term	Recoverable	Negative	Moderate	Probable	Moderate
	With Mitigation	Regional	Long term	Reversible	Negative	Low	Low probability	Low
Fatality curiosity	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Long term	Reversible	Negative	Low	Probable	Low
Smaller genetic pool	Without Mitigation	Regional	Long term	Irreversible	Negative	Moderate	Highly probable	Moderate
	With Mitigation	Regional	Long term	Recoverable	Negative	Moderate	Probable	Low
Archaeology, Paleontology and Heritage								
Disruption of the cultural landscape due to the presence of construction equipment and activity	Without Mitigation	Local	Long term	Irreversible	Negative	High	Definite	High
	With Mitigation	Local	Long term	Recoverable	Negative	Moderate	Definite	Moderate
Visual/landscape								
Visual impact on residents of homesteads	Without Mitigation	Very short distance	Long term	Reversible	Negative	Very High	Definite	Very High

Operation Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
and visitors to tourist accommodation within 5 km to the proposed WEF	With Mitigation	Very short distance	Long term	Reversible	Negative	Very High	Definite	Very High
Visual impact on observers travelling along the roads within 5 km to the proposed WEF	Without Mitigation	Very short distance	Long term	Reversible	Negative	High	Definite	Very High
	With Mitigation	Very short distance	Long term	Reversible	Negative	High	Definite	Very High
Visual impact on residents of homesteads and visitors to tourist accommodation within 5-10 km to the proposed WEF	Without Mitigation	Short distance	Long term	Reversible	Negative	Very High	Definite	High
	With Mitigation	Short distance	Long term	Reversible	Negative	Very High	Definite	High
Visual impact on observers travelling along roads within 5-10 km to the proposed WEF	Without Mitigation	Short distance	Long term	Reversible	Negative	High	Definite	High
	With Mitigation	Short distance	Long term	Reversible	Negative	High	Definite	High
Visual impact on visitors to formally protected areas within 5-10 km to the proposed WEF	Without Mitigation	Short distance	Long term	Reversible	Negative	Very High	Definite	High
	With Mitigation	Short distance	Long term	Reversible	Negative	Very High	Definite	High
Visual impact on residents of homesteads and visitors to tourist accommodation within 10-20 km to the proposed WEF	Without Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Highly Probable	Moderate
	With Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Highly Probable	Moderate
Visual impact on observers travelling along roads within 10-20 km to the proposed WEF	Without Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Probable	Moderate

Operation Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
Visual impact on visitors to formally protected areas and private nature reserves within 10-20 km to the proposed WEF	Without Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Highly Probable	Moderate
	With Mitigation	Medium distance	Long term	Reversible	Negative	Moderate	Highly Probable	Moderate
Visual impact of shadow flicker on sensitive visual receptors in close proximity to the proposed WEF	Without Mitigation	Very short distance	Long term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Very short distance	Long term	Reversible	Negative	Moderate	Probable	Moderate
Visual impact of lighting at night on residents and visitors to homesteads and tourist accommodation within 10 km from the proposed WEF	Without Mitigation	Short to medium distance	Long term	Reversible	Negative	Very High	Definite	High
	With Mitigation	Very short distance	Long term	Reversible	Negative	High	Highly Probable	Moderate
Visual impact of lighting at night on observers travelling along roads within 10 km from the proposed WEF	Without Mitigation	Short to medium distance	Long term	Reversible	Negative	High	Definite	High
	With Mitigation	Very short distance	Long term	Reversible	Negative	Moderate	Highly Probable	Moderate
Visual impact of the ancillary infrastructure on observers in close proximity to the structures	Without Mitigation	Very short distance	Long term	Reversible	Negative	High	Highly Probable	High
	With Mitigation	Very short distance	Long term	Reversible	Negative	Moderate	Probable	Moderate
The potential impact on the sense of place of the region	Without Mitigation	Long distance	Long term	Reversible	Negative	Very High	Definite	Very High
	With Mitigation	Long distance	Long term	Reversible	Negative	Very High	Definite	Very High
Noise								

Operation Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Daytime operation of WTG	Without Mitigation	Local	Long-term	High	Negative	Low	Improbable	Low
	With Mitigation	Local	Long term	High	Negative	Low	Improbable	Low
Night-time operation of WTG	Without Mitigation	Regional	Long-term	High	Negative	Low	Possible	Low
	With Mitigation	Regional	Long-term	High	Negative	Low	Possible	Low
Socio-economic								
Improve energy security and support renewable sector	Without Mitigation	Local, Regional and National	Long term	Reversible	Positive	High	Highly Probable	High
	With Mitigation	Local, Regional and National	Long term	n/a	Positive	High	Definite	High
Creation of employment and business opportunities	Without Mitigation	Local and Regional	Long term	n/a	Positive	Low	Highly Probable	Moderate
	With Mitigation	Local and Regional	Long term	n/a	Positive	Moderate	Highly Probable	Low
Generate income for affected landowners	Without Mitigation	Local	Long term	Reversible	Positive	Low	Probable	Low
	With Mitigation	Local	Long term	Reversible	Positive	High	Definite	Moderate

Operation Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Benefits associated with the socio-economic development contributions	Without Mitigation	Local and Regional	Long term	Reversible	Positive	Moderate	Probable	Low
	With Mitigation	Local and Regional	Long term	Reversible	Positive	High	Definite	Moderate
Visual impact and impact on sense of place	Without Mitigation	Long distance	Long term	Reversible	Negative	Very High	Definite	Very High
	With Mitigation	Long distance	Long term	Reversible	Negative	Very High	Definite	Very High
Potential impact on property values	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Long term	Reversible	Negative	Low	Probable	Low
Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place	Without Mitigation	Local	Long term	Reversible	Negative	Medium-High	Highly Probable	Moderate-High
	With Mitigation	Local	Long term	Reversible	Negative	Medium-High	Highly Probable	Moderate-High
Potential impact on local tourism operations	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Long term	Reversible	Negative	Low	Probable	Low
Potential impact on local tourism	Without Mitigation	Local	Long term	Reversible	Negative	Moderate	Improbable	Low

Operation Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
	With Mitigation	Local	Long term	Reversible	Negative	Low	Improbable	Low
Traffic and Transportation								
Increase in general peak hour traffic volumes	Without Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Very Low
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Very Low
Increase in abnormal traffic volumes	Without Mitigation	Regional	Immediate	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Regional	Immediate	Recoverable	Negative	Low	Low Probability	Moderate
Impact of dust along gravel site access roads	Without Mitigation	Site	Immediate	Recoverable	Negative	Low	Low Probability	Low
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Improbable	Very Low
Deterioration of surrounding road network	Without Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low

DECOMMISSION PHASE IMPACTS

Decommission Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Freshwater & Wetlands (Aquatics)								
Spread of Alien Vegetation	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium

Decommission Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Loss of habitat/vegetation	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Loss of Critical Biodiversity Areas (CBAs)	Without Mitigation	Local	Long term	Recoverable	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Partly Reversible	Negative	Low	Low Probability	Low
Loss of riparian habitat	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Changes to the hydrological regime and increase potential for erosion	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Changes to surface water quality	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Terrestrial Biodiversity								
	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium

Decommission Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Potential vegetation clearing	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low
Potential chemical contamination	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Medium
Reduced connectivity and restricted movement of fauna	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low
Potential altered flow regime	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Probable	Low
Potential disturbance and/or displacement	Without Mitigation	Regional	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Moderate
Potential mortality of faunal and flora species	Without Mitigation	Local	Long term	Irreversible	Negative	High	Highly Probable	Very High
	With Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Probable	High
Faunal								
Direct habitat loss	Without Mitigation	Site	Medium term	Recoverable	Negative	Moderate	Highly Probable	Moderate
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Highly Probable	Moderate

Decommission Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Indirect habitat loss	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Highly Probable	Moderate
Displacement or disturbance	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Moderate
Direct Mortality	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	High
Indirect Mortality	Without Mitigation	Site	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	High
Impacts of all phases of the proposed development on ecological processes of the area	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Local	Medium term	Recoverable	Positive	Moderate	Probable	High
Bats								
Decommissioning activities	Without Mitigation	Local	Short term	Recoverable	Negative	Moderate	Definite	Moderate
	With Mitigation	Local	Short term	Reversible	Negative	Low	Definite	Low
Noise								

Decommission Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
Potential Cumulative Noise Impacts	Without Mitigation	Regional	Long term	High	Negative	Low	Possible	Low
	With Mitigation	Regional	Long term	High	Negative	Low	Possible	Low
Socio-economic								
Retrenchment including loss of jobs, and source of income.	Without Mitigation	Local	Short term	n/a	Negative	Moderate	Probable	Moderate
	With Mitigation	Local	Short term	n/a	Negative	Low	Probable	Low
Traffic and Transportation								
Increase in general peak hour traffic volumes	Without Mitigation	Regional	Short term	Recoverable	Negative	Low	Probable	Low
	With Mitigation	Local	Short term	Reversible	Negative	Low	Probable	Very Low
Increase in abnormal traffic volumes	Without Mitigation	National	Short term	Recoverable	Negative	Moderate	Probable	High
	With Mitigation	National	Short term	Recoverable	Negative	Moderate	Probable	Moderate
Impact of dust along gravel site access roads	Without Mitigation	Site	Immediate	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low
Deterioration of surrounding road network	Without Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Site	Immediate	Reversible	Negative	Low	Low Probability	Low

CUMULATIVE PHASE IMPACTS

Construction Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
Freshwater & Wetlands (Aquatics)								
Cumulative impacts on the aquatic resources of the area	Without Mitigation	Local	Long term	Irreversible	Negative	Moderate	Probable	Medium
	With Mitigation	Site	Short term	Recoverable	Negative	Low	Low Probability	Low
Terrestrial Biodiversity								
Potential changes in broad-scale ecological processes brought on by vegetation clearing	Without Mitigation	National	Permanent	Irreversible	Negative	High	Highly Probable	Very High
	With Mitigation	Regional	Long term	Recoverable	Negative	Moderate	Possible	High
Faunal								
Impacts of landcover and land-use to the long-term persistence and viability of animal SCCs in the area	Without Mitigation	Regional	Long term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Regional	Long term	Recoverable	Positive	Moderate	Probable	High
Avifauna								
Cumulative impacts on	Without Mitigation	Small	Long term	High	Negative	Very High	Highly likely	High

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
birds during construction and operation	With Mitigation	Regional	Long term	Low	Negative	High	Probable	Moderate - High
Bats								
Activities associated with construction of solar farms within 30 km combined with the wind farm	Without Mitigation	Local	Medium term	Recoverable	Negative	Moderate	Definite	Moderate
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Low
Visual								
The potential cumulative visual impact of wind farms on the visual quality of the landscape	Overall impact of the proposed project considered in isolation	Medium distance	Long term	Reversible	Negative	High	Highly Probable	High
	Cumulative impact of the Hugo and Khoe WEFs	Medium distance	Long term	Reversible	Negative	Very High	Definite	Very High
Noise								
Numerous WTG	Without Mitigation	Regional	Long term	High	Negative	Low	Possible	Low

Construction Phase		Extent	Duration	Reversibility	Status	Significance	Probability	Magnitude
operating simultaneously from various WEFs in area	With Mitigation	Regional	Long term	High	Negative	Low	Possible	Low
Socio-economic								
Cumulative impacts on sense of place and the landscape	Without Mitigation	Medium distance	Long term	Reversible	Negative	High	Highly Probable	High
	With Mitigation	Medium distance	Long term	Reversible	Negative	Very High	Definite	Very High
Cumulative impacts on local services	Without Mitigation	Local	Long term	Reversible	Negative	Low	Probable	Low
	With Mitigation	Local and regional	Long term	Reversible	Negative	Moderate	Probable	Low
Impact on local community	Without Mitigation	Local	Long term	Reversible	Positive	Moderate	Highly Probable	Low
	With Mitigation	Local and regional	Long term	Reversible	Positive	High	Highly Probable	High
Traffic and Transportation								
Increase in general peak hour traffic volumes	Without Mitigation	Regional	Short term	Recoverable	Negative	Low	Probable	Probable
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Probable
Increase in abnormal traffic volumes	Without Mitigation	Regional	Short term	Recoverable	Negative	Moderate	Highly Probable	High
	With Mitigation	Regional	Short term	Recoverable	Negative	Moderate	Probable	Probable

Construction Phase		**Extent**	**Duration**	**Reversibility**	**Status**	**Significance**	**Probability**	**Magnitude**
Impact of dust along gravel site access roads	Without Mitigation	Site	Immediate	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Site	Immediate	Recoverable	Negative	Low	Low Probability	Low
Deterioration of surrounding road network	Without Mitigation	Regional	Short term	Recoverable	Negative	Low	Probable	Moderate
	With Mitigation	Local	Short term	Recoverable	Negative	Low	Probable	Low

DFFE: INFORMATION REQUIREMENTS FOR WIND ENERGY FACILITIES

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.

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

Farm Name	Portion No.	Farm No.	SG 21 Codes
Ou de Kraal	RE	145	C08500000000014500000
Stinkfonteins Berg	RE	147	C08500000000014700000
Stinkfontein	RE	172	C08500000000017200000
Driehoek	0	173	C08500000000017300000
Presents Kraal	RE	174	C08500000000017400000
Helpmekaar	9	148	C08500000000014800009

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 7.5 km southeast of De Doorns within the Breede Valley Local Municipality.
Facility Area	Approximately 100 ha. This is the permanent development footprint
Photos of areas that give a visual perspective of all parts of the site	Refer to the Visual Impact Assessment Report (Volume II)
Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)	Refer to the Visual Impact Assessment Report (Volume II)

TABLE 0-3 WEF TECHNICAL DETAILS

Component	Description/Dimensions
Maximum Generation Capacity	Up to 336 MW
Turbine Capacity (MW)	Up to 8 MW
Type of technology	Onshore Wind
Number of Turbines	Up to 42
WTG Hub Height from ground level	Up to 150 m

Component	Description/Dimensions
Blade Length	Up to 100 m
Rotor Diameter	Up to 200 m
Structure height (Tip Height)	Up to 250 m
Structure orientation	Wind regime dependent
Area occupied by both permanent and construction laydown areas	• Concrete turbine foundations - approximately up to 1,000 m^2 per turbine • Each turbine will have a hardstand area of approximately up to 7,500 m^2 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	132/33 kV
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 (Figure 1) 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 m
Water supply, volumes required	±26,500 m^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 MAP AND GIS INFORMATION

Site Maps and GIS Information	Report Reference
All maps/information layers are provided in ESRI Shapefile format.	

Site Maps and GIS Information	Report Reference
All affected farm portions must be indicated.	Figure 2
The exact site of the application must be indicated (the areas that will be occupied by the application).	Figure 1
A *status quo* map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	Figure 4
Agricultural fields	Figure 4
Grazing areas	Figure 4
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	Figure 5
Critically endangered and endangered vegetation areas that occur on the site	Figure 5
Bare areas which may be susceptible to soil erosion	Figure 5
Cultural historical sites and elements	Section 6.3 and 6.4
Rivers, streams and water courses	Figure 5
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	Figure 5
High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	Figure 4
Buffer zones (also where it is dictated by elements outside the site): 500 m from any irrigated agricultural land 1 km from residential areas	Figure 6.1 to 6.3
Indicate isolated residential, tourism facilities on or within 1 km of the site	Section 6.5
A map/layer that indicate locations of birds and bats including roosting and foraging areas	Figure 6.1 - 6.3
A site development proposal map(s)/layer(s) that indicate: 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	Figure 3

Site Maps and GIS Information	Report Reference
elements which they serve (to make commenting on sections possible).	
River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.	Figure 5
Substation(s) and/or transformer(s) sites including their entire footprint.	Figure 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).	Grid connection will form part of a separate application process
Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill	This will be provided in the final design approval of the development layout.
Borrow pits	No borrow pits on site. Licensed borrow pits will be used to source material.
Spoil heaps (temporary for topsoil and subsoil and permanently for excess material) Buildings including accommodation	Temporary and permanent spoil heaps will be kept within demarcated construction areas, and monitored by the ECO during the construction phase.

TABLE 0-5 DEVELOPMENT AREA GEOGRAPHIC COORDINATES – HUGO WEF

Proposed Hugo WEF Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
	WEF Boundary	
Reference Point 1	33° 25' 5.41'' S	19° 52' 34.15'' E
Reference Point 2	33° 25' 45.85'' S	19° 54' 1.13'' E
Reference Point 3	33° 28' 49.57'' S	19° 52' 34.48'' E
Reference Point 4	33° 29' 44.63'' S	19° 52' 48.24'' E
Reference Point 5	33° 29' 47.80'' S	19° 51' 37.40'' E
Reference Point 6	33° 30' 14.92'' S	19° 51' 38.75'' E
Reference Point 7	33° 31' 5.43'' S	19° 49' 7.10'' E
Reference Point 8	33° 31' 2.35'' S	19° 47' 4.33'' E
Reference Point 9	33° 32' 16.45'' S	19° 47' 54.47'' E
Reference Point 10	33° 32' 0.538'' S	19° 46' 30.43'' E
Reference Point 11	33° 32' 13.39'' S	19° 45' 20.59'' E
Reference Point 12	33° 31' 49.58'' S	19° 44' 52.11'' E
Reference Point 13	33° 30' 20.36'' S	19° 45' 7.29'' E
Reference Point 14	33° 30' 14.75'' S	19° 45' 50.19'' E

Proposed Hugo WEF Site Boundary and Associated Infrastructure		
Reference Point 15	33° 28' 51.93'' S	19° 46' 12.05'' E
Reference Point 16	33° 28' 43.29'' S	19° 49' 20.97'' E
Reference Point 17	33° 28' 43.29'' S	19° 49' 20.97'' E
Preferred Laydown Area		
Northwest Corner	33° 27' 47.21'' S	19° 49' 39.97'' E
Northeast Corner	33° 27' 48.87'' S	19° 49' 56.74'' E
Southeast Corner	33° 27' 57.85'' S	19° 49' 56.35'' E
Southeast Point 1	33° 27' 57.57'' S	19° 49' 52.71'' E
Southeast Point 2	33° 27' 56.41'' S	19° 49' 52.72'' E
Southeast Point 3	33° 27' 55.75'' S	19° 49' 46.56'' E
Southeast Point 4	33° 27' 52.92'' S	19° 49' 46.93'' E
Southwest Corner	33° 27' 52.11'' S	19° 49' 39.35'' E
Preferred BESS		
Northwest Corner	33° 27' 52.11'' S	19° 49' 39.35'' E
Northeast Corner	33° 27' 52.92'' S	19° 49' 46.93'' E
Southwest Corner	33° 28' 0.29'' S	19° 49' 38.1'' E
Southeast Corner	33° 28' 0.71'' S	19° 49' 45.97'' E
Preferred Substation		
Northwest Corner	33° 27' 55.75'' S	19° 49' 46.56'' E
Northeast Corner	33° 27' 56.41'' S	19° 49' 52.72'' E
Southeast Corner	33° 28' 1.15'' S	19° 49' 52.36'' E
Southwest Corner	33° 28' 0.71'' S	19° 49' 45.97'' E
Preferred OMM		
Northwest Corner	33° 27' 57.85'' S	19° 49' 56.35'' E
Northeast Corner	33° 27' 48.87'' S	19° 49' 56.74'' E
Southeast Corner	33° 28' 1.39'' S	19° 49' 55.94'' E
Southwest Corner	33° 28' 1.15'' S	19° 49' 52.36'' E
Alternate Laydown Area		
Northwest Corner	33° 28' 47.06'' S	19° 49' 5.89'' E
Northeast Corner	33° 28' 48.27'' S	19° 49' 10.78'' E
Southeast Corner	33° 29' 4.83'' S	19° 49' 7.17'' E
Southwest corner	33° 29' 3.22'' S	19° 48' 58.35'' E
Southeast Point 1	33° 28' 59.72'' S	19° 48' 58.94'' E
Southeast Point 2	33° 28' 59.94'' S	19° 49' 0.21'' E
Southeast Point 3	33° 28' 53.91'' S	19° 49' 1.52'' E

Proposed Hugo WEF Site Boundary and Associated Infrastructure		
Southwest Point 4	33° 28' 54.53'' S	19° 49' 4.24'' E
Alternative BESS		
Northwest Corner	33° 28' 44.87'' S	19° 48' 58.03'' E
Northeast Corner	33° 28' 47.06'' S	19° 49' 5.89'' E
Southeast Corner	33° 28' 54.53'' S	19° 49' 4.24'' E
Southwest Corner	33° 28' 52.74'' S	19° 48' 56.59'' E
Alternative Substation		
Northwest Corner	33° 28' 52.74'' S	19° 48' 56.5'' E
Northeast Corner	33° 28' 53.91'' S	19° 49' 1.52'' E
Southeast Corner	33° 28' 59.94'' S	19° 49' 0.21'' E
Southwest Corner	33° 28' 58.99'' S	19° 48' 55.47'' E
Alternative OMM		
Northwest Corner	33° 28' 58.99'' S	19° 48' 55.47'' E
Northeast Corner	33° 28' 59.72'' S	19° 48' 58.94'' E
Southeast Corner	33° 29' 3.22'' S	19° 48' 58.35'' E
Southwest Corner	33° 29' 2.59'' S	19° 48' 54.81'' E

1. INTRODUCTION

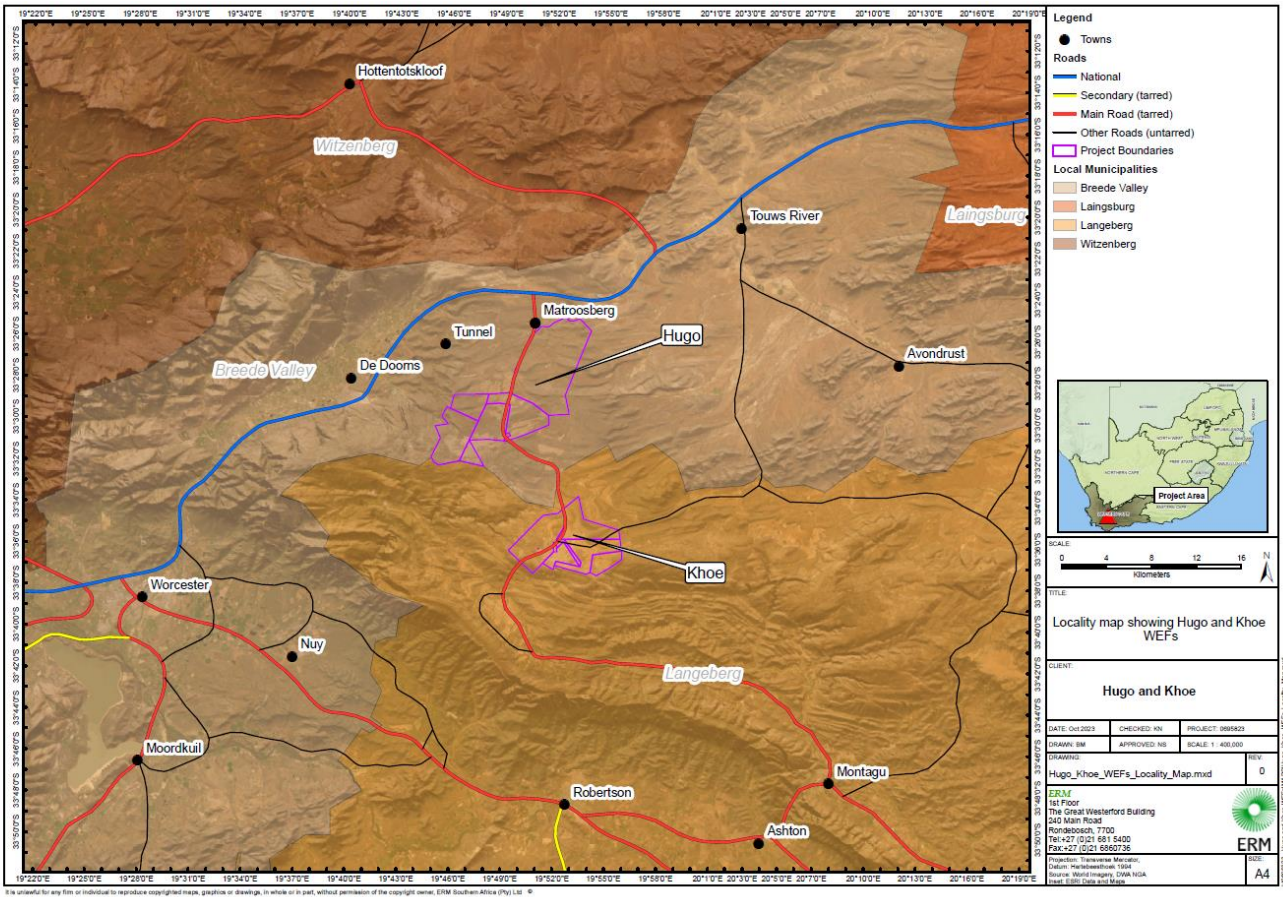
1.1 PROJECT OVERVIEW

FE Hugo and Khoe (Pty) Ltd is applying for an Environmental Authorisation (EA) to construct and operate the Hugo Wind Energy Facility (WEF) with a capacity of up to 336 MW. It should be noted that the capacity of the WEF has been reduced from 360 MW to 336 MW, due the number of turbines being removed. 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 Hugo WEF as well as its associate infrastructure will be referred to as the “proposed development”.

The proposed development is located approximately 7.5 km southeast of the De Doorns town within the Breede Valley Local Municipality and the Cape Winelands District Municipality of the Western Cape Province (Figure 1-1). FE Hugo and Khoe also proposed to develop and operate the Khoe WEF which is situated approximately 10 km south of the Hugo WEF. The Khoe WEF is part of a separate application process. However, being run in parallel to the Hugo WEF application process. As such, this report is strictly pertaining to the development and operation of the proposed Hugo WEF.

In terms of Chapter 5 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), to act as the Environmental Assessment Practitioner (EAP) and to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for Environmental Authorisation.

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



1.2 PURPOSE AND AIM OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The National Environment Management Act, 1998 (Act No 107 of 1998) (NEMA) promotes the use of scoping and EIA to ensure the integrated environmental management of activities.

Section 24(1) of NEMA states:

"In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority charged by this Act with granting the relevant environmental authorisation."

EIA is ultimately a decision-making process with the specific aim of selecting an option that will provide the most benefit and cause the least impact. The EIA process should identify activities which may have a detrimental effect on the environment, and which would therefore require EA prior to commencement.

1.3 DFFE COMMENTS ON THE DRAFT EIA REPORT

TABLE 1-1 COMMENTS RECEIVED FROM THE DFFE ON THE DRAFT EIA REPORT

No.	Comment from DFFE	EAP Response	Section in Report
DFFE Reference: 14/12/16/3/3/2/2515 Enquiries: Ms Azrah Essop **COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED UP TO 336MW HUGO WIND ENERGY FACILITY (WEF) AND ANCILLARY INFRASTRUCTURE, NEAR DE DOORNS, IN BREEDE VALLEY LOCAL MUNICIPALITY AND CAPE WINELANDS DISTRICT MUNICIPALITY WITHIN THE WESTERN CAPE PROVINCE**			
The amended application form and draft Environmental Impact Assessment Report (EIAR) received by the Department on 23 August 2024 refers. This letter serves to inform you that the following information must be included in the final EIAR:			
1.Application Form			
a	If the activities applied for in the application form differ from those mentioned in the final EIAR, an amended application form must be submitted. Please note that the Department's application form template is available on our website.	The listed activities represented in the final EIAr do not differ from those in the application form, which has been included in the final EIAr.	Refer to the final EIAr and Section 3 - Table 3-1 of the Final EIA Report.
b	The description of the listed activities must be project specific and include thresholds of the proposed activities where possible.	The description of the listed activities is specific to the project and thresholds have been included.	Refer to the final EIAr and Section 3 - Table 3-1 of the Final EIA Report.

No.	Comment from DFFE	EAP Response	Section in Report
c	The original application was for 360MW but has since dropped to 336MW. Please include reference for this in the report.	The final EIAr has been updated to include the MW reduction.	Refer to Section 1.1 of the Final EIAr.
d	Please shorten file names and reduce the number of compounded folders	This has been duly noted and file names uploaded have been shortened.	Not Applicable
2.Public Participation Process (PPP)			
a	A Comments and Response trail report (C&R) must be submitted with the final EIAR. The C&R report must incorporate all comments for this development in chronological order and ordered according to the phase comment was received in i.e. Draft scoping phase, final scoping phase etc. The C&R report must be a separate document from the main report and the format must be in the table format. All comments from I&APs must be responded to. A response such as "noted" is not regarded as an adequate response to I&AP's comments. Please separate comments per reporting stage clearly i.e. DSR, FSR and the draft EIAR.	The C&R report is included in Volume III and is therefore separate from the main report. Comments received have been adequately addressed and have been tabulated in the C&R report.	Please refer to Volume III
b	Please ensure that comments from all relevant stakeholders are submitted to the Department with the final EIAR. This includes but is not limited to the relevant Provincial Department, provincial Department of Agriculture, the Local and District Municipalities, the	Comments have been received from the Department of Environment, Forestry and Fisheries: Directorate Biodiversity and Conservation for the draft EIA Phase.	Please refer to Volume III

No.	Comment from DFFE	EAP Response	Section in Report
	Department of Water and Sanitation (DWS), the South African Heritage Resources Agency (SAHRA), BirdLife SA, the Department of Mineral Resources and Energy, and the Department of Environment, Forestry and Fisheries: Directorate Biodiversity and Conservation.		
c	The final EIAR must comply with all conditions or comments of the acceptance of the scoping report (SR) and the Plan of Study for Environmental Impact Assessment (PoSEIA). The final EIAR must address all comments received on the SR and the draft EIAR. Proof must be provided in terms of communications. Please include the original copies of the comment letters received.	The Final EIAr has considered the comments received during scoping phase.	Please refer to Volume III
d	Confirm whether comments from this Department only, were received on the final Scoping report. All the other comments contained in the WEF PPP report are from the draft scoping phase.	No comments were received from other organs of state on the FSR.	Not Applicable
e	The Public Participation Process must be conducted in terms of Regulation 39, 40, 41, 42, 43 & 44 of the NEMA EIA Regulations, 2014, as amended. Proof of all public participation activities must be included in the final EIAR.	The public participation process for the Khoe WEF has been conducted in terms of Regulation 39, 40 41, 42, 43 & 44 of the EIA Regulations 2014, as amended.	Please refer to Volume III
f	Include the timeframes for all aspects of the PPP e.g. DSR commenting phase was from XXX to XXX; FSR comment phase, adverts, etc.	This has been updated in the Final EIAr and Public Participation report.	Please refer to Volume I: Section 9 and Volume III

No.	Comment from DFFE	EAP Response	Section in Report
g	The comments and responses report included has missing 'formatting' aspects i.e. there are column lines missing which separate columns of text. Furthermore, the text is difficult to read as it is copied and pasted without formatting and numbering. This makes reviewing the document difficult. Please improve the formatting of this document.	This has been updated and revised in the Final EIAr.	Please refer to Volume III
h	Ensure that the details of the I&AP commenting are clear in the Comments and Responses table (Volume II of the draft EIAR). This column should include the date of comment, phase of the project; the name of the person commenting, and the company represented.	This has been updated and revised in the Final EIAr.	Please refer to Volume III
i	Provide clarity if Drie Kuilen Nature Reserve was included in the I&AP database and notified of the availability of the reports from the draft SR phase.	Registration details of Drie Kuilen Nature reserve was sent to ERM by our social specialist on the 9th April. By that date, the public participation for the scoping phase had been concluded (29 February and 02 April 2024). Drie Kuilen Nature Reserve was included as an I&AP during the EIA phase of the Project.	Please refer to CRR, Appendix F
3.Final Layout Maps			

No.	Comment from DFFE	EAP Response	Section in Report
a	All available biodiversity information must be used in the finalisation of the final layout map. Existing infrastructure must be used as far as possible, e.g. roads.	Please refer to Figure 2.	Please refer to Volume I - Figures
b	It must be emphasised that the final EIAR must include a final layout map (clearly labelled and annotated) which adheres to specialist recommendations as well as the identified no-go areas, must be included. Failure to provide a final layout map may be a fatal flaw to the decision-making process.	Your comment has been noted and several figures have been included in Volume I.	Please refer to Volume I
c	If possible, in addition to the included sensitivity maps, please provide a cumulative sensitivity map which shows the range of sensitivity from *low* to *very high*. This will allow for an overview of the designated sensitive layers.	Figure has been included.	Please refer to Figure 8
d	The map provided titled: *Figure 7 0695823-GIS-010 Hugo Sensitivity _ Cumulative*, must be submitted at a finer scale.	Figure 7 has been revised.	Figure 7.1 and 7.2
4.Specialist Reports			
a	All specialist studies must be final, and provide detailed/practical mitigation measures for the preferred alternative and recommendations, and must not recommend further studies to be completed post EA.	Specialist studies are final, with no further studies recommended.	Volume II

No.	Comment from DFFE	EAP Response	Section in Report
b	Findings and recommendations of the specialist studies must be incorporated with the final report and the EMPr for decision making. Additionally, the EAP must clarify which mitigation measures recommended by specialists cannot be implemented if the current layout is maintained.		
c	Visual: The site is situated along the R 318, a designated tourist route as per the Langeberg Spatial Development Framework (SDF) (2023). Additionally, the area hosts several provincial and private nature reserves, as well as tourist facilities. The Visual Impact Assessment indicates that turbines for the proposed Hugo WEF are still positioned in areas with high visual sensitivity. The motivation provided by the EAP on page 364 of the draft EIAR is acknowledged, however it requires further detail. The EAP motivation should be revised to specify the exact turbine numbers and address all turbines located in high sensitivity areas, not only in terms of visual impact but also considering other sensitive regions, such as the protected Matroosberg Mountain Catchment Area.	EAP motivation has been revised to encompass all turbines located in high sensitivity visual areas, as well as those in the Matroosberg Catchment Area. This includes a justification as to why these turbines can remain in the Catchment Area.	Summary of Specialist Results and Section 12.11
d	Section 13.1 of the draft EIAR: This section mentions conditions to be included as quoted from the Freshwater and Wetlands, Bats, Heritage and Archaeology and Palaeontology impact assessments only. Please elaborate	The Final EIAr has been updated to include conditions and recommendations for noise, avifauna, socio-economic, traffic and transportation and visual/landscape.	Please refer to Section 13.1

No.	Comment from DFFE	EAP Response	Section in Report
	on why the remaining specialist assessments and/or recommendations have not been included in this section.		
5.Environmental Management Programme			
a	The final EMPr must also include the following: • All recommendations and mitigation measures recorded in the EIAR and the specialist studies conducted. • An environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process.	The EMPr has been updated accordingly.	Please refer to Volume I
b	In addition to the above, the EMPr must comply with Appendix 4 of the EIA Regulations, 2014, as amended.	The EMPR complies with Appendix 4 of the EIA Regulations, 2014, as amended.	Please refer to Volume I
c	Ensure that a signed version of the generic EMPr for the substation are submitted with the final EIAR. This is over and above the EMPr for the facility. Please ensure that the Generic EMPr for the substation is submitted as a separate signed PDF document and not contained as part of the EMPR document 0695823_Hugo WEF EMPr_20240823.	This Generic EMPR has been signed by the applicant and included as a separate signed document.	Please refer to Volume I

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 associated mitigation measures required to avoid or mitigate potential negative impacts, as well as to improve or maximise the potential benefits of the development.

In terms of legal requirements, the NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the EIA Report 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 EIA Report. Section 9 of this EIAr provides a summary of the Public Participation Process (PPP) and Volume III of this EIAr includes all Public Participation undertaken to date. As comments were received these have been collated and included in this EIAr.

As per the EIA Regulations 2014, as amended, "*the objective of the environmental impact assessment process is to, through a consultative process-*

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;

(c) identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the:

> *(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and*
>
> *(ii) degree to which these impacts –*
>
> *(aa) can be reversed;*
>
> *(bb) may cause irreplaceable loss of resources, and*
>
> *(cc) can be avoided, managed or mitigated;*

(e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;

(g) identify suitable measures to avoid, manage or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.'

The above activities were 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 was investigated, through a review of relevant background literature and ground-truthing and any required long-term on-site monitoring.

The primary objective of the EIA 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

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
3 (1)	*An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-*	
(a)	*details of-* *the EAP who prepared the report; and* *the expertise of the EAP, including a curriculum vitae;*	Section 2 Appendix A
(b)	*the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including-* *the 21 digit Surveyor General code of each cadastral land parcel;* *where available, the physical address and farm name;* *where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;*	Executive Summary
(c)	*a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-* *a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or* *on land where the property has not been defined, the coordinates within which the activity is to be undertaken;*	Figure 3
(d)	*a description of the scope of the proposed activity, including-* *all listed and specified activities triggered and being applied for; and* *a description of the associated structures and infrastructure related to the development;*	Section 3
(e)	*a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;*	Section 3 and 5

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		**Location in EIA**
(f)	*a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;*	Section 5
(g)	*a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;*	Section 7 and 8
(h)	*a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:*	
	details of the development footprint alternatives considered;	Section 7 and 8
	details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9 Volume 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;	Section 9
	the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 6
	the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed or mitigated;*	Section 10 and 11
	the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 4 Volume II
	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;	Section 10 and 11
	the possible mitigation measures that could be applied and level of residual risk;	Section 10 and 11
	if no alternative development footprints were investigated, the motivation for not considering such; and	Section 7
	a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Section 8
(i)	*a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred development footprint within the approved site as contemplated in the accepted scoping report through the life of the activity, including -*	

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
	a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 10
	an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 10
(j)	*an assessment of each identified potentially significant impact and risk, including-* *cumulative impacts;* *the nature, significance and consequences of the impact and risk;* *the extent and duration of the impact and risk;* *the probability of the impact and risk occurring;* *the degree to which the impact and risk can be reversed;* *the degree to which the impact and risk may cause irreplaceable loss of resources; and* *the degree to which the impact and risk can be mitigated;*	Section 11
(k)	*where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;*	Section 12
(l)	*an environmental impact statement which contains-* *a summary of the key findings of the environmental impact assessment;* *a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and* *a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*	Section 12 and 13 Figure 6.1 – 6.3
(m)	*based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;*	Section 12 and 13 Volume II
(n)	*the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;*	Section 8
(o)	*any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;*	Section 13
(p)	*a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;*	Section 2 Volume II
(q)	*a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;*	Section 13

Appendix 3 Requirements NEMA, 1998 (Act No. 107 of 1998)		Location in EIA
(r)	*where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;*	The proposed activity includes operational aspects.
(s)	*an undertaking under oath or affirmation by the EAP in relation to-* *the correctness of the information provided in the reports;* *the inclusion of comments and inputs from stakeholders and I&APs;* *the inclusion of inputs and recommendations from the specialist reports where relevant; and* *any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; and*	Appendix A
(t)	*where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;*	n/a
(u)	*An indication of any deviation from the approved scoping report, including the plan of study, including-* *any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and* *a motivation for the deviation;*	n/a Specialist following the same methodology and protocols in the EIA phase. There are no deviations from the approved Plan of Study
(v)	*any specific information that may be required by the competent authority; and*	Section 13
(w)	*any other matters required in terms of section 24(4)(a) and (b) of the Act.*	n/a
3 (2)	*Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to an environmental impact assessment report the requirements as indicated in such notice will apply.*	Volume II

2.1 STRUCTURE OF THE EIA REPORT

The EIA report is set out in three volumes:

- Volume I: EIA Report;
- Volume II: Specialist Reports; and
- Volume III: Public Participation Report (including Comments and Responses table).

2.2 DEVIATIONS FROM PLAN OF STUDY

There are no deviations from the approved PSEIA.

2.3 THE APPLICANT

The Project Applicant appointed ERM, with the lead EAP being Stephanie Gopaul 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.

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, Bridgeway Precinct, Century City, Cape Town		
Postal address	15 Bridgeway Road, Bridgeway 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		

2.4 DETAILS OF THE EAP

The co-ordination and management of this environmental application process is being conducted by Environmental Resources Management Southern Africa (Pty) Ltd (‘ERM) with the lead EAP being Stephanie Gopaul. Refer to Appendix A for the EAP’s Declaration of Interest and Curriculum Vitae.

Company of EAP	**Environmental Resource Management Southern Africa (Pty) Ltd.**
EAP name and surname	Stephanie Gopaul
EAP Qualifications and Professional affiliations	• Masters in Environmental Management, University of the Free State, South Africa, 2012 • BSc. Environmental and Engineering Geology, University of KwaZulu Natal, South Africa, 2005
Physical address	Regus, Floor -3, 18 The Boulevard, Westway Office Park, Westville, Durban
Postal address	As above
Postal code	3629
Telephone	+27105963502
Cell phone	+27656660066
E-mail	stephanie.gopaul@erm.com / hugokhoe@erm.com

2.4.1 THE SPECIALISTS

The Applicant in consultation with the EAP, assembled a team of technical specialists to undertake studies for the proposed Hugo WEF and associated infrastructure.

The specialists' fields of investigation are listed in Table 2-2 below. The areas of investigation were identified as relevant to the proposed development as per the results of the DFFE screening report generated, experience of the EAP, and consultation with the listed specialists who were selected based on their experience in the field of renewable energy projects, and the locality of the proposed development.

The same team of specialists undertook the scoping of the proposed development and have implemented the plan of study for EIA in their impact assessment reports (Volume II).

TABLE 2-2 LIST OF SPECIALISTS INVESTIGATION

Discipline	Specialist	Specialist Organisation
EAP	Stephanie Gopaul	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	ACO Associates cc
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	ERM
Freshwater and Wetlands (Aquatics)	Brian Colloty	EnviroSci

2.5 ASSUMPTIONS AND LIMITATIONS

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. The following assumptions and limitations are noted for the EIA report and the specialist studies conducted (Volume II) as part of the proposed developments' EIA process.

2.5.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

There were no specific assumptions, uncertainties or gaps in knowledge or data that affected the findings of the study.

2.5.2 FRESHWATER AND WETLANDS

Obtaining comprehensive understanding of the dynamics of both the flora and fauna of communities within study sites, as well as the status of endemic, rare or threatened species in any study area, assessments should consider investigations at different time scales (across seasons/years) and through replication. Due to time constraints these long-term studies are not feasible and are thus mostly based on instantaneous sampling. This limitation is common to many impact assessment type studies, but the findings are deemed adequate for the purposes of decision-making, unless otherwise stated.

Due to the scope of the work for the assessment of the proposed development, a long-term investigation of the proposed site was not possible and not perceived as part of the Terms of Reference (ToR). A concerted effort was made to sample and assess as much of the potential site, as well as make use of any supporting literature, species distribution data and aerial photography.

Information presented by the specialist, which have been included in this EIA, only has reference to the study area as indicated on the accompanying maps and cannot be applied to any other area without detailed investigation.

2.5.3 TERRESTRIAL BIODIVERSITY

SCC are classified as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD) and Rare.

The identity of several plants of SCC are withheld from this and subsequent reports due to the sensitivity of these species to illegal harvesting. These species are known by numerical identifiers (Sensitive Species 142, 207, 521, 654, 692, 871 and 1209) assigned by the SANBI. The identity of these species has been made available to the Specialist for consideration during the compilation of reports relevant to the study area.

Previous studies used to compile online species distribution datasets used to supplement the species list for the proposed Hugo WEF and associated infrastructure PAOI are extremely limited and cannot be seen as fully representative of the diversity of plant species potentially on site.

Where online databases provided records of species that have several sub-species but provided no reference to which sub-species were recorded, it was assumed the sub-species were that with the greatest conservation importance.

2.5.4 FAUNAL

Inventory surveys of animal species occurring across a site are difficult to achieve within the time-frames associated with an EIA. To compile a comprehensive site-specific list would require extensive sampling. For assessment purposes, it is considered more important to identify species and processes of conservation value that may be impacted upon. Therefore, this assessment attempts to identify threatened and other significant species, important habitats, and ecological processes. Camera trap survey design was focused to meet the study objectives, and full species inventories were not the primary objective of this study, but rather the confirmation of presence. A study[4] on the camera trapping of mammals in open scrubland suggested that reliable estimates

[4] Colyn, R.B., Radloff, F.G.T. & O'Riain, M.J. Camera trapping mammals in the scrublands of the Cape Floristic Kingdom—the importance of effort, spacing and trap placement. Biodivers. Conserv. 27, 503–520 (2018). DOI: 10.1007/s10531-017-1448-z

of species richness can be achieved when cameras are spaced 1 x 1 km apart and left in the targeted area until a survey effort of 1000 days is realized. More elusive species may require between 1,600 and 3,000 camera trap days or a change in sampling intensity and number of deployment sites. The spatial and temporal deployment of the camera trap survey therefore unlikely resulted in a complete species inventory of the study area, however the 1,832 camera trap days was considered sufficient for the purposes of this study.

It is not possible to confirm the absence of a species with certainty, particularly rare or low-density species or species with short, not-fully understood activity windows (e.g. some insect species). If species were not detected, they were nonetheless assumed to be present for assessment purposes. Presence confirmation was considered more significant than absence. However, at locations where presence was confirmed, they were generally detected and recorded relatively soon after camera trap deployment and regularly thereafter throughout the deployment period. This indicates that they are relatively common within areas of suitable habitat, and it is considered unlikely that they were present at sites where they were not detected. Not all patches of suitable habitat were monitored, it is assumed that if e.g., a Riverine Rabbit (*Bunolagus monticularis*) was detected within a certain habitat type or patch, that the species is present throughout that habitat type or patch. Current distribution and habitat suitability models for Riverine Rabbit largely utilize abiotic factors and sighting records and are likely subject to refinement as research on this poorly understood species improves.

While independent image captures were determined through the exclusion of multiple images of the same individual taken during the same instance, independent captures may nevertheless represent the same individual taken at different times and therefore the number of independent captures does not indicate the population size at a location in this study.

2.5.5 FLORA

- The contents of this report relate to the proposed Hugo WEF and associated infrastructure.
- SCC are classified as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD) and Rare.
- The identity of several plant- SCC are withheld from this- and subsequent reports due to the sensitivity of these species to illegal harvesting. These species are known by numerical identifiers (Sensitive Species 142, 207, 521, 654, 692, 871 and 1209) assigned by the SANBI. The identity of these species has been made available to the Specialist for consideration during the compilation of reports relevant to the study area.
- Previous studies used to compile online species distribution datasets used to augment the species list for the proposed Hugo WEF and associated infrastructure PAOI are extremely limited and cannot be seen as fully representative of the diversity of plant species potentially on site.
- Where online databases provided records of species that have several sub-species but provided no reference to which sub-species was recorded, it was assumed the sub-species was that with the greatest conservation importance.

2.5.6 AVIFAUNA

The SABAP2 national dataset is relatively sparse from this area with 47 full-protocol cards in the 29 pentads that cover the Hugo wind energy facility site and surrounds. These were only used in the modelling to give a historical perspective on overall species richness.

Any site visits to record birds, even over a 12-month period, may not provide a complete picture of all species likely to occur in an arid region. Rainfall is the chief limiting factor as it dictates if, and when, birds occur and whether they breed on site (Dean 2004, Seymour et al. 2015). While drought dominated southern Africa from 2014-2019, above average rainfall occurred and provided a boom period for avian species that may otherwise may not have occurred. Thus, the data presented represent a "worst case scenario" at a particularly species-rich moment.

The CRM analysis is a data hungry model that requires large data sets for each species to determine probabilities and give accurate risk assessments. Some species did not reach these thresholds – either because they were seldom recorded (Lanner Flacon) or because they were rarely recorded within the Blade Swept Area (Southern Black Korhaan), both Red Data species. While this means that no risk assessments can be determined, it also means that the risk for these species is likely to be very low simply because they were seldom recorded on site.

One of the most difficult variables to record is the flying height of a bird, and sources of error are expected. To minimise this, known height objects on site were used to assist with gauge height. For example, all wind energy facilities have weather masts (Met masts) varying from 80 m to 120 m to measure wind speeds. These and pylon towers (typically 38 m high for the 400 kV or 765 kV) transmission lines, also helps gauge the altitude at which birds are flying.

2.5.7 BATS

An EIA must fit into a range of legislative and commercial processes, which dictate the timeframes and budgets of the studies that inform the EIA process. A rigorous scientific study would by its nature take longer and cost more than is feasible in terms of an EIA specialist study. The legislated time period for pre-assessment bat monitoring is approximately 12-months. Ideally, data collected over three or four years would provide a more comprehensive and robust indication of bat presence and activity under a range of weather conditions. These limitations are recognised, and every step is taken to manage them to ensure a thorough study is undertaken, based on credible scientific approaches.

Although it is an internationally accepted way of presenting bat data, the use of bat monitoring detectors to measure the relative abundance of bat activity as 'low', 'medium', or 'high', has limitations. This element of subjectivity is due to the extent that the results are based on the specialist's experience in interpreting the data into a qualitative baseline assessment report. A 'cautious' approach should be considered concerning accepting bat numbers as absolute true data, and hence recent guidelines regarding bat monitoring recommend a 'standardised' approach and include statistical formulas and calculations. Examples of assumptions and limitations in monitoring methods are highlighted below.

The knowledge of certain aspects of South African bats, such as population size, spatial and temporal movement patterns (e.g. migration and flying heights), and how bats may be impacted by wind energy, is limited, as their behaviour differs when comparing with the same type of European or American bat species.

Data is extrapolated from recordings of bat calls over large areas, whereas acoustic monitoring only samples small areas of space. Furthermore, the sound recording of the bat echolocation could be influenced by the type and intensity of the call, the bat species, the detector system used, the orientation of the signal relative to the microphone, and other environmental conditions, such as weather conditions.

The accuracy of species identification is dependent on the calls used for proof of identity but can be influenced by variation in bat calls within species, and between different species, and the overlapping of species call parameters. Although species names are mentioned, true species identification can only really be conducted when handling the bat. Species are identified as those that are the most likely due to call parameters and distribution maps, but confirmation of species will only be possible during the post-construction phase if a bat carcass is collected.

Bat detectors record bat activity, but the sensors cannot distinguish between a single bat passing multiple times, which could lead to double counting or multiple bats of the same species passing the device once (Kunz et al. 2007). Therefore, if we discuss bat activity, it means that bats were active on-site. If we talk about high bat activity, one could nevertheless derive that there are many bats on the terrain. Comparative studies of bat activity from similar locations are used to verify baseline information. Due to the overlap of calls, it is not possible to provide an exact number of bats passing the recorder. Therefore, the number of bats passing is not an exact count, but as close as possible under the given circumstances, and within the limitations of the survey techniques.

Bats do not echolocate in a uniform, monotonous way. For example, when they go on a feeding frenzy, it is difficult to identify a species from the sound of a call. Sometimes a species could also echolocate at a frequency somewhat higher or lower than the normal identifiable frequency. These calls could then be nearer to the range of another species. For this study, bat calls from unidentifiable species were recorded as 'unclear'. These calls are identified as a bat, but uncertainty exists as to the species identification.

Weather stations were situated at 117 m, while the bat monitoring system with which the weather was correlated, was situated at 100 m. The ideal is that the weather monitor is at the system, but a 17 m difference should nevertheless provide a fairly accurate correlation.

It is not possible to search the entire site as well as the wider neighbouring terrain for bat roosts, as small roosts can be found in numerous rock crevices, aardvark holes, or under the bark of some trees. However, the site is walked through as thoroughly as possible, within the legislated time frames of a bat impact assessment, as discussed above, and any roosts or indication of bat presence discovered during ground-truthing are incorporated into the study.

Only a year of pre-construction bat monitoring is required by legislation in South Africa, but changing weather conditions result in sporadic changes in the bat situation with consequent higher insect activity, resulting in higher bat activity. Weather changes could therefore result in changes in bat activity and the region experienced exceptionally high rainfall during 2023. Bats might therefore be less active in the following years if rainfall is lower or within the normal range for the region.

2.5.8 HERITAGE AND ARCHAEOLOGY

The archaeological survey was carried out at the surface level only and therefore any completely buried archaeological sites would not be readily located. It is not always possible to determine the depth of archaeological material visible at the surface.

Although we believe that most of the relevant archaeological assessments and HIAs from the area have been located and reviewed, it is acknowledged that some reports may not have been identified for review.

The Specialist was unable to reach all areas of the proposed WEF on account of heavy rain during the site visit. The area received 100 mm of rain in a single night (half of the average annual rainfall). Farm roads suffered wash-aways in the extreme northern corner of Helpmekaar (Portion 9 of Farm 148) and in areas of Presents Kraal (Remainder of Farm 174) and the muddy conditions meant that we were also unable to access the WTGs positions on Stinkfonteins Berg (Remainder of Farm 147). Elsewhere in the WEF area, although going was heavy at times, access was possible.

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 (2023_Q4) located within 30 km of the Hugo WEF.

The assessment of cumulative impacts is also limited by the quality of other heritage surveys in the region, which can be variable, and the density of such other project reports.

2.5.9 PALEONTOLOGY

Based on the geology of the area and the paleontological record, it can be assumed that the formation and layout of the quartzites, mudstones, sandstones, shales and sands are typical for the country, and some might contain fossil plants, traces of bioturbation and invertebrate. The overlying soils and sands of the Quaternary period would not preserve fossils.

2.5.10 VISUAL/LANDSCAPE

To prepare this report, LoGis utilised only the documents and information provided by ERM or any third parties directed to provide information and documents by ERM. LoGis has not consulted any other documents or information in relation to this report, except where otherwise indicated. The findings, recommendations and conclusions given in this report are based on the author’s best scientific and professional knowledge, as well as, the available information.

This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. LoGis and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, or pertaining to this investigation.

This assessment was undertaken during the planning stage of the project and is based on information available at that time. It is assumed that all information regarding the project details provided by ERM and the Applicant is correct and relevant to the proposed project. This Visual Impact Assessment and all associated mapping has been undertaken according to the worst-case scenario with the layout provided.

The findings, recommendations and conclusions given in this report are based on the author's best scientific and professional knowledge, as well as, the available information. This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. LOGIS reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, or pertaining to this investigation.

Although LOGIS exercises due care and diligence in rendering services and preparing documents, LOGIS accepts no liability, and ERM, by receiving this document, indemnifies LOGIS and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with the services rendered, directly or indirectly by the use of the information contained in this document.

This report may not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If this report is used as part of a main report, the report in its entirety must be included as an appendix or separate section to the main report.

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

This Visual Impact Assessment and all associated mapping has been undertaken according to the worst-case scenario.

2.5.11 NOISE

Ambient sound levels are cumulative effects of innumerable sounds generated at various instances both far and near. A high measurement does not equate to an area that is constantly noisy. Low sound levels do not mean an area is always quiet. Sound levels are variable across seasons, time of day, dependent on faunal characteristics, vegetation present, and meteorological conditions. The Environmental Noise Impact Assessment (ENIA) (Volume II) provides a full list of assumptions and limitations related to the assessment of noise impacts.

2.5.12 SOCIO-ECONOMIC

It is assumed that the development site represents a technically suitable site for the establishment of the proposed WEF and associated infrastructure.

The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

There are no limitations that have a material bearing on the SIA.

2.5.13 TRAFFIC AND TRANSPORTATION

The assessment has been prepared based on the information provided by the Client and the following assumptions, amongst others:

- It was assumed that the construction period will last approximately 2 years with a 5-day working week resulting in 480 working days over 24 months.
- Construction trips were estimated without a detailed construction schedule programme.
- For the assessment of cumulative impacts, a conservative approach was adopted by assuming that all wind energy facilities within 30 km currently approved, planned or proposed would be constructed concurrently.
- WTG components will be imported and transported with abnormal vehicles from the most feasible port of entry/harbour.
- Haulage will occur on surfaced national and provincial roads and existing site access gravel roads.
- Construction material and labour force will be sourced locally.

3. ENVIRONMENTAL LEGAL FRAMEWORK

The proposed development requires EA prior to being constructed and operated. This section of the report highlights the important environmental legal considerations taken while undertaking the 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 the Hugo 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)	*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;*	FE Hugo and Khoe propose to develop an on-site substation at the 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 33 kV 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)	*The development of– (ii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs- (a) within a watercourse; or (c) within 32 metres of a watercourse*	The WEF will require the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 100m2 within or within 32m of drainage features, ephemeral washes or streams present within the project site.
Listing Notice 1 GN R 327 Activity 14	*The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters.*	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 m3 but not exceeding 500 m3. The volumes are not known at the time but will have a maximum combined capacity of 490 m3.
Listing Notice 1 GN R 327 Activity 19(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.*	Drainage features, ephemeral washes or streams are present within the project sites. During the construction phase, more than 10 m3 of rock will be removed from drainage features for the construction of the WEF 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)	*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;*	The width of the internal access roads between the project components will be approximately 8 m but may be up to 10 m wide where required for the movement of the crane between turbine positions
Listing Notice 1 GN R 327 Activity 28(ii)	*Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.*	The total area to be developed for the WEF (including the facilities substation) 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 100 ha.
Listing Notice 1 GN R 327 Activity 56(i)(ii)	*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.*	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	*The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.*	The Hugo WEF is anticipated to have an electricity capacity of up to 336 MW.
Listing Notice 2 GN R 325 Activity 15	*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*	The total for the Hugo WEF is ~7,900 ha, with a development footprint of up to 100 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)	*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*	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 safe delivery of the WTG components. Internal

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
		roads will provide access to each turbine, the on-site substation hub (which includes substation infrastructure, BESS and Balance of Plant area). The project site is located within the Western Cape Province, outside of an urban area on land containing indigenous vegetation.
Listing Notice 3 GN R 324 Activity 18(i)(ii)(aa)	*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) the Western Cape, and in (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;* *(aa) Areas containing indigenous vegetation.*	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.

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 consider 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 area of aesthetic significance.

The heritage and paleontology impact assessment reports has been submitted to HWC for comment on 21 August 2024.

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 a 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 has taken 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.

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 centred on a Vision and four Guiding Objectives defining the direction of climate change response action for the region, with corresponding targets and actions.

3.10 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.

3.10.1 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/m²/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.

3.10.2 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.

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

3.11.1 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.

3.11.2 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 has been conducted and has proposed ways to manage alien invasive species.

3.12 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 and 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.

3.13 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.

3.14 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.

3.15 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 Hugo WEF.

3.16 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 SACCAA 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) has been included as a stakeholder and will continue to be provided with an opportunity to comment on the application during the public participation process.

3.17 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 has and will be adhered to during all stakeholder engagement activities undertaken as part of this S&EIA process.

3.18 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.

3.19 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 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.

3.20 CONVENTIONS AND TREATIES

3.20.1 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 2016.5

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

3.21 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.

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

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.

3.21.1 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.

3.21.2 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*".

3.21.3 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.

3.22 POLICIES AND GUIDELINES

3.22.1 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 considered, 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).

3.22.2 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.

3.22.3 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.

3.22.4 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
Performance Standard 1: Assessment and Management of Environmental and Social (E&S) Risks and Impacts **Objective:** Underscores the importance of identifying E&S risks and impacts and managing E&S performance throughout the life of a project.	
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.	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: • Description of relevant Policy; • 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.	
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.	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. In terms of the proposed development, construction will require the appointment of an EPC contractor (and others) for completion. Appointment of contactors and employees will be ‘fair and equal’, and workers will be provided with a safe, healthy and inclusive work environment. The EMPr has incorporated the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.
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.	

PS Description	Project Applicability
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.	The Project is not likely to have many large-scale and long-term impacts related to pollution. Measures to address air, water and land pollution has been included in the EMPr. There are no material resource efficiency issues associated with the proposed development and the EMPr has included general resource efficiency measures. 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. 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. 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.
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.	
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.	The requirements for PS 4 have been addressed in this report and will be managed in accordance with the EMPr. 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. The EIA has evaluated 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.
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.	
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	Not Applicable

PS Description	Project Applicability
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.	
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.	
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.	In terms of protecting and conserving biodiversity, specialists have assessed the impacts of the proposed development within the area of influence and have recommended further measures to prevent/avoid/mitigate these potential impacts during the EIA phase. 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 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.
Performance Standard 7: Indigenous Peoples Objective: Aims to ensure that the development process fosters full respect for Indigenous Peoples.	
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.	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.
Performance Standard 8: Cultural Heritage Objective: Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.	
Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.	A cultural heritage impact assessment and paleontological impact assessment has been undertaken for the proposed development. Consultation has been undertaken with the SAHRA and will continue during the EIA phase.

4. SCOPE OF WORK AND EIA PHASE METHODOLOGY

The EIA process formally commenced with notifying the CA, in this case the DFFE, of the proposed development through the submission of an application form. The EAP, along with the team of technical specialists, commenced the scoping phase to make informed decisions of the appropriate "scope" of the EIA process. The existing environmental baseline of the site proposed for development was established during this phase through a desktop assessment and site visits. The type of development was considered and its anticipated impacts on the existing environment informed the specialists' studies to be undertaken. The methodology of how these impacts have been assessed within the EIA phase is also determined. The EIA Phase was undertaken in line with the approved PSEIA. The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity has been set out in the EIA report.

A Draft Scoping Report (DSR) (ERM, February 2024) for the proposed development was made available for public and stakeholder comment for a prescribed 30-day consultation period. All comments received in response to the DSR were considered and as appropriate, incorporated into the FSR and Plan of Study for EIA (PSEIA). The FSR and PSEIA (ERM, April 2024) were then submitted to the DFFE for approval. Interested and Affected Parties (I&APs) were able to review FSR and PSEIA as submitted to the DFFE.

The FSR presented and assessed the initial proposed WEF layout and associated infrastructures of the Hugo WEF and its associated infrastructure. In May 2024, the DFFE accepted the FSR. The results of the specialists' scoping assessments, DFFE comments on the FSR, and other technical and financial constraints for the proposed development site were taken into consideration and a revised preferred layout was produced.

This EIA report presents and assesses a revised mitigated layout for the proposed development and will be made available for a prescribed 30-day consultation period. Any comments received will be considered and incorporated as applicable into a Final EIA report. Once a Final EIA report has been submitted, the DFFE will make a decision within 107 days on whether to grant or refuse EA. I&APs will be notified of the availability of the Final EIA report for their review as per the FSR.

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 Basic Assessment (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., Infrastructure | Electricity | Generation | Renewable | Wind. No intersections with Environmental Management Frameworks (EMF) were found. In terms of development incentives, restrictions, exclusions or prohibitions, no intersections 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 this 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.

Table 4-1 provides a summary of the specialist assessments identified by the screening tool reports, and the response to each assessment in terms of the proposed development.

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

TABLE 4-1 SPECIALIST ASSESSMENTS IDENTIFIED IN TERMS OF THE NATIONAL WEB-BASED SCREENING TOOL FOR THE HUGO WEF

Identified Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
Agriculture Theme	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.	Very High Sensitivity	High Sensitivity
	Comment: The site is classified as ranging from low to very 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.		
Landscape / Visual 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	High Sensitivity
	Comment: According to the visual impact assessment the significance of the visual impacts associated with the proposed Hugo Wind Energy Facility is expected to be very high to high as a result of the generally undeveloped character of the landscape and its inability to absorb changes of this magnitude.		
Archaeological and Cultural Heritage Theme	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no	Low Sensitivity	Low Sensitivity

Identified Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
	specific assessment protocol has been prescribed, gazetted on 20 March 2020.		
	Comment: The screening tool report shows the archaeological and heritage sensitivity to be low throughout the study area. The site visit confirmed that the site is a heritage environment of variable sensitivity but that significant impacts on archaeological resources arising from the project are unlikely.		
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 2,000 m 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	Moderate Sensitivity
	Comment: According to the Visual Impact Assessment, the significance of shadow flicker is anticipated to be moderate.		
Paleontology Theme	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 Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
	This development area was allocated a rating of Very High Sensitivity by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. However, a paleontological assessment for the adjacent proposed 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 that project area is much lower than indicated on the SAHRA map.		
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	Very High Sensitivity
	Comment: The site is predominantly classified as Very High Sensitivity by the DFFE Online Screening Tool, while remaining areas are classified as Low Sensitivity. This is due to the intersection of the PAOI with various important biodiversity areas including PAs such as the Matroosberg Mountain Catchment Area, CBAs, ESAs, FEPAs and SWSAs. It is the Specialists opinion that the DFFE Online ST Assessment of Very High Sensitivity in the Terrestrial Biodiversity Theme for some areas is accurate. High sensitivity areas are predominantly those listed as CBAs. All other areas are either Medium Sensitivity or Low Sensitivity.		
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	Very High Sensitivity
	Comment: The 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 • Freshwater Ecosystem Priority areas (FEPA) Sub-catchment • Rivers_Conservation Score AB • Rivers_Conservation Score D		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	• Strategic Water Resource Area SWSA (Surface Water) _Groot Winterhoek • Wetlands_Southern Fynbos Bioregion (Valley-bottom) • Wetlands_Western Fynbos-Renosterveld Bioregion (Depression) Based on the outcome of the assessment, the specialist agrees with the environmental sensitivities identified on site.		
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).	High Sensitivity	High Sensitivity
	Comment: The DFFE Screening Tool (Animal Theme) classified the area as of High Sensitivity (based on the presence of three 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 (SABAP2) including specialist species records indicates 206 species recorded, of which 21 are Priority species, of which 10 are Red Data species. Therefore, it can be confirmed the site is of High Sensitivity, and the data and Collision Risk Models allows for the reduce risk by constructing a detailed spatial picture of the risks to the Priority birds present.		
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
	Comment: The Screening Tool Report indicated that there are Civil Aviation Installations within 8 km 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.		

Identified Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
Defense Theme	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Defense Installations, gazetted on 20 March 2020.	Low Sensitivity	Low Sensitivity
	Comment: Site verification confirms the low sensitivity. During the public consultation, the South African National Defense Force (SANDF) was consulted by the EAP / Project Applicant to confirm that there will be no impact on the defense installation of the development area and immediate surrounds.		
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
	Comment: Site verification confirms the low sensitivity. During the public consultation, the South African Radio Astronomy Observatory (SARAO) was 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.		
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
	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		

Identified Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
	commencement of the construction phase. The EAP has not included this assessment as part of the application process.		
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
	Comment: The DFFE Online ST identifies the study area as having a predominantly Medium Sensitivity in the Plant Species Theme, with some areas of Low Sensitivity. It is the Specialists opinion that the DFFE Online ST Assessment of Medium Sensitivity in the Plant Species Theme for some areas is accurate. High sensitivity areas are predominantly those listed as CBAs. All other areas are either Medium Sensitivity or Low Sensitivity.		
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
	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 (Aves – Aquila verreauxii) and Black Harrier (Aves – Circus maurus). 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 (Insecta – Aloeides caledoni) and Riverine Rabbit. The site visit confirmed that the medium sensitivity areas indicated by the National Web-based Screening Tool are too poorly resolved to provide a realistic representation of the sensitivity of the site with sufficient detail to inform the development and mitigate potential risks to terrestrial animals (particularly Riverine Rabbit).		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	From an avifaunal perspective, it can be confirmed the site is of High Sensitivity, and the data and Collision Risk Models allows for the reduce risk by constructing a detailed spatial picture of the risks to the Priority birds present.		
Bats 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	High Sensitivity
	Comment: The Department of Forestry, Fisheries, and the Environment's (DFFE) Screening Tool Report showed a high sensitivity to the bats (wind) theme. The required Site Sensitivity Verification Report confirmed that the proposed Hugo WEF has high sensitivity in terms of bats. This was confirmed by the bat monitoring exercise. Adhering to recommended mitigation measures and the incorporation of "no go" and "high sensitivity" areas reduce the risk for bats and allow for the wind development in designated areas.		
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
	Comment: Socio-economic assessment was identified as a required specialist assessment, but no environmental sensitivity was determined by the screening report. A full impact assessment was undertaken by the specialist for the EIA phase of the development.		
Traffic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has	Not Determined	Medium to Low Sensitivity

Identified Specialist Assessment	**Assessment Protocol**	**Identified Sensitivity**	
		By DFFE Screening Report	By Specialist / EAP
	been prescribed, gazetted on 20 March 2020.		
	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 proposed development and final layout can be supported from a traffic engineering point of view. The base year and forecast year road capacity has indicated that the proposed development will have little to no significant impact on the existing road network capacity and intersection operational performance.		

4.2 SPECIALIST METHODOLOGY

To evaluate the potential environmental impacts, information relating to the existing environmental conditions were collected through field and desktop research. Climate change is expected to affect the proposed development site over the lifetime of the proposed development; however, the nature, scale and severity of climate change effects are uncertain. Given this uncertainty, the existing environment is assumed to remain constant throughout the lifetime of the proposed development and forms the current and future baseline for the impact assessments.

4.2.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 24 October 2023. It was also informed by existing climate, soil, and agricultural potential data for the site. The aim of the on-site assessment was to:

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

Soils were assessed based on the investigation of existing soil exposures in combination with indications of the surface conditions and topography. Soils were classified according to the South African soil classification system (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 the 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. Even with this level of detail, it is highly unlikely that it would have any influence on agricultural impact.

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 date on which this assessment was done has no bearing on its results.

4.2.2 FRESHWATER AND WETLANDS (AQUATICS)

The methodology used by the specialist was developed with the renewable industry in mind, coupled with the minimum requirements stipulated by DFFE and the Department of Water and

Sanitation (DWS). The study followed the approaches of several national guidelines regarded for aquatic assessments. These were then modified by the specialist, to provide a relevant mechanism of assessing the present state of the study systems applicable to the specific environment, and in a clear and objective manner, assess the potential impacts associated with the proposed development site. The methodology also included the considerations of the Macfarlene & Bredin (2017) buffer models and revisions to the SANBI National Wetland Inventory.

The assessment made use of the National Wetland Classification System (NWCS) approach and included delineating any natural waterbodies and assessing the potential consequences of the proposed development on the surrounding watercourses.

The findings of the specialist assessment were supported by baseline data during a site visit, 1-3 September 2023, after heavy rainfall and the onset of the growing season.

The aquatic report was produced to meet the criteria to fulfil a Specialist Assessment Report as portions of the proposed development area were rated as very high sensitivity as per the DFFE Screening Tool.

4.2.3 TERRESTRIAL BIODIVERSITY

4.2.3.1 DESKTOP STUDY

The desktop study was initiated by obtaining the proposed development area's expected sensitivity in the Terrestrial Biodiversity Theme using the DFFE Online Screening Tool (ST)[6], which is informed by the Western Cape Biodiversity Spatial Plan[7]. The recorded land-use of the proposed PAOI was determined using the latest available South African National Land Cover (SANLC, 2020)[8] spatial datasets and Quantum Geographic Information System (QGIS). These data were compared with previously identified important biodiversity areas in proximity to the Project by consulting the following resources:

- The Red List of Ecosystems (RLE, 2022) spatial dataset[9] to determine the Red List Status and Category of ecosystem(s) within the proposed PAOI.
- The Breedevalley Key Biodiversity Areas (KBA) spatial dataset[10] 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 PAOI.
- The SANBI 2018 Beta Vegetation Map of South Africa, Lesotho and Swaziland Spatial Dataset11 to determine the Vegetation Units present within the proposed PAOI.
- The 2011 National Freshwater Ecosystem Priority Areas (NFEPA) river[12] and wetland[13] datasets.

[6] https://screening.environment.gov.za/screeningtool/#/pages/welcome
[7] https://www.capenature.co.za/uploads/files/protected-area-management-plans/SANBI_WCBSP-Handbook.pdf
[8] https://egis.environment.gov.za/sa_national_land_cover_datasets
[9] http://bgis.sanbi.org/SpatialDataset/Detail/6715
[10] http://bgis.sanbi.org/SpatialDataset/Detail/641
[11] http://bgis.sanbi.org/SpatialDataset/Detail/670
[12] http://bgis.sanbi.org/SpatialDataset/Detail/397
[13] http://bgis.sanbi.org/SpatialDataset/Detail/395

- The International Union for the Conservation of Nature's (IUCN) Red List[14] to confirm the international Red List Status and Category of plant species that have been recorded in the proposed PAOI.

In addition, the resources below were consulted to compile a list of plant and animal SCC that are potentially present within the proposed development area footprint:

- The SANBI Plants of Southern Africa (POSA) Brahms database[15] to identify plant species that have been recorded in the proposed PAOI.
- The Biodiversity and Development Institute's Virtual Museum database[16] to determine the presence of plant and animal species that have been recorded in the proposed PAOI.
- The Global Biodiversity Information Facility (GBIF) database[17] to determine the presence of plant and animal species that have been recorded in the proposed PAOI.
- The SANBI Red List of South African Species[18] to confirm the national Red List Status and Category of species that have been recorded in the proposed PAOI.
- The International Union for the Conservation of Nature's (IUCN) Red List[19] to confirm the international Red List Status and Category of plant species that have been recorded in the proposed PAOI.

4.2.3.2 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 by the DFFE Online ST, and land use as described by the SANLC (2020).

An additional site visit was conducted (10 – 16 March 2024) to conduct terrestrial biodiversity surveys to determine species presence and distribution on site in correlation with the Scoping Phase project layout.

4.2.3.3 SITE ECOLOGICAL IMPORTANCE (SEI)

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.

4.2.4 FAUNAL

4.2.4.1 DESKTOP STUDY

The output of the Screening Tool was supplemented with outputs from biodiversity databases such as the various atlassing projects of the Virtual Museum[20], iNaturalist[21] and the GBIF[22]

[14] https://www.iucnredlist.org/
[15] https://posa.sanbi.org/sanbi/Explore
[16] https://vmus.adu.org.za/
[17] https://www.gbif.org/
[18] http://speciesstatus.sanbi.org/
[19] https://www.iucnredlist.org/
[20] http://vmus.adu.org.za/vm_projects.php
[21] https://www.inaturalist.org/
[22] http://gbif.org

network to determine which additional species may occur in the area. Conservation status was cross-referenced with National[23] and International[24] databases. Publicly available data and published literature were consulted and referenced throughout, where relevant.

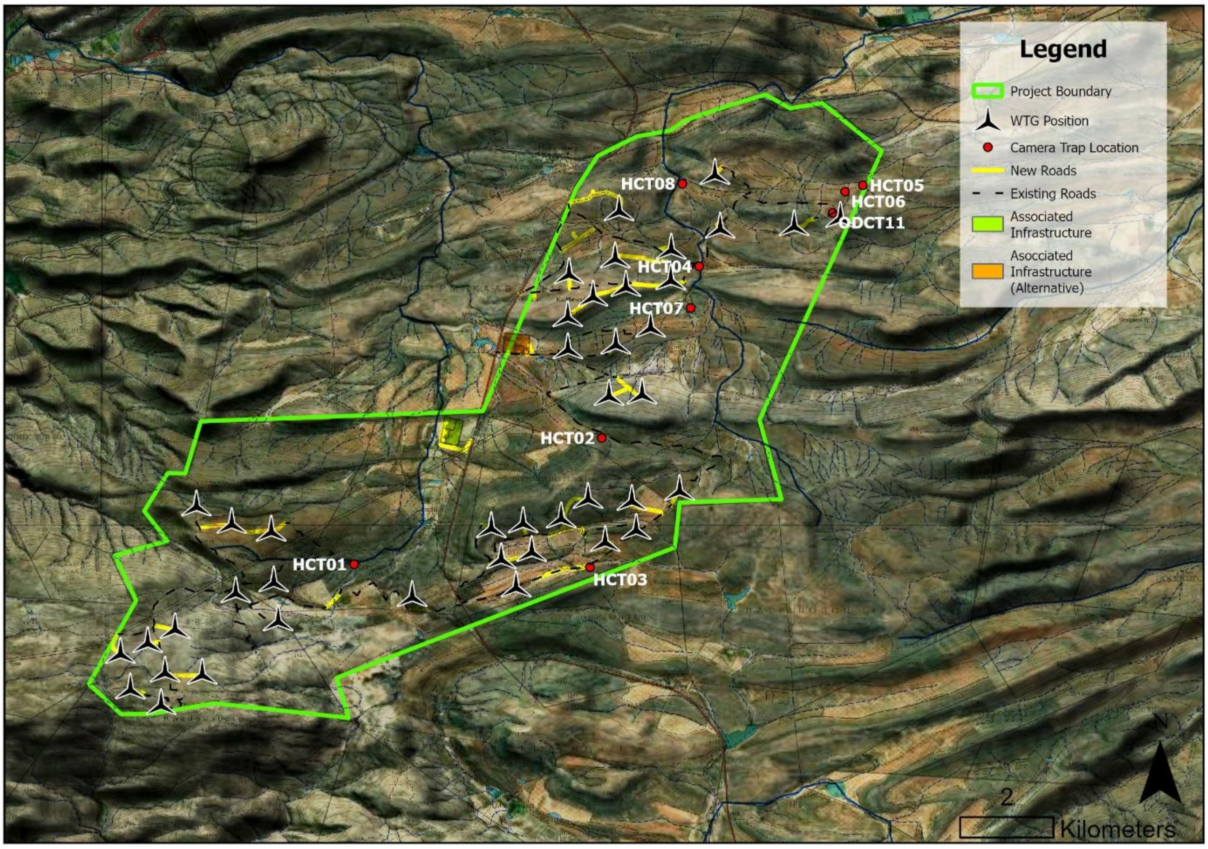
4.2.4.2 SITE SURVEY

Nine sampling sites were selected across the proposed site to maximize the likelihood of detecting animal SCCs and investigate the potential utilization of the site by these species (particularly Riverine Rabbit). Camera traps were deployed based on the specialist's prior experience in faunal surveys for these species and included sites representative of natural or near-natural habitat, modified habitat and along a topographic gradient (Figure 4-1). Two additional sites positioned in a nearby site were surveyed simultaneously and included in the analyses given their proximity to the proposed site (8.5 km between sampling sites) and availability of similar habitat types.

- **Duration:** 44 weeks
- **Date:** 17 February 2022 – 23 December 2022
- **Season:** Late summer, autumn, winter, spring and early summer
- **Relevance:** Sampling was conducting through a wide-range of conditions experienced over the monitoring period, increasing confidence in the outcome of the assessment
- **Effort:** Camera traps were deployed across the site for a combined 1,832 camera trap days. Camera trap deployment duration ranged from 90 nights (HCT05) to 307 nights (HCT06).

[23] http://speciesstatus.sanbi.org/
[24] https://www.iucnredlist.org/

FIGURE 4-1 CAMERA TRAP SAMPLING SITES



Spartan Lumen Dual Flash Scouting Cameras (Model: SR3-CX S39) were utilized in the study to provide high-quality, full-colour, night-time images (i.e. using white-flash) to facilitate positive differentiation between Riverine Rabbit and hares. Passive Infrared (PIR) sensor sensitivity was set to "normal" using the in-camera settings, with a trigger interval (quiet period) of 5 seconds.

4.2.4.3 DATA ANALSYES

An initial, automated batch classification was on raw image data in R[25] using MegaDetector to classify images into 'blank' (i.e. false-triggers) or animal detections. Automatic classifications were manually validated prior to manual species identification. Data was captured following the Camera Trap Metadata Standard (CTMS)[26] and explored following modified methods obtained from the Wildlife Coexistence Lab[27]. Camera Trap labelled ODCT11 was excluded from image analyses as it was set to record video rather than static images and records were therefore considered separately.

4.2.4.4 SENSITIVITY MAPPING

The 2020 South African National Land-Cover (SANLC) dataset, 2022 Red List of Ecosystems (RLE) for terrestrial realm for South Africa, publicly available satellite imagery, normalized

[25] R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/
[26] Forrester, T., T. O'Brien, E. Fegraus, P. Jansen, J. Palmer, R. Kays, J. Ahumada, B. Stern and W. McShea. (2016). An Open Standard for Camera Trap Data. Biodiversity Data Journal. 4:e10197. https://doi.org/10.3897/BDJ.4.e10197
[27] Department of Forest Resources Management, University of British Columbia, 2424 Main Mall, Vancouver, BC, Canada V5T 1Z4

difference vegetation index (NDVI), Screening Tool output and field observations of vegetative cover were considered in combination with camera trap survey data to delineate habitats relevant to the impacts of the proposed development type and animal SCCs.

4.2.5 FLORA

4.2.5.1 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)[28]. The recorded land-use of the proposed PAOI was determined using the latest available South African National Land Cover (SANLC, 2020)[29] 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 dataset[30] to determine the Red List Status and Category of ecosystem(s) within the proposed PAOI.
- The Breedevalley Key Biodiversity Areas (KBA) spatial dataset[31] 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 PAOI.
- The SANBI 2018 Beta Vegetation Map of South Africa, Lesotho and Swaziland Spatial Dataset[32] to determine the Vegetation Units present within the proposed PAOI.

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

- The SANBI Plants of Southern Africa (POSA) Brahms database[33] to identify plant species that have been recorded in the proposed PAOI.
- The Biodiversity and Development Institute's Virtual Museum database[34] to determine the presence of plant species that have been recorded in the proposed PAOI.
- The Global Biodiversity Information Facility (GBIF) database[35] to determine the presence of plant species that have been recorded in the proposed PAOI.
- The SANBI Red List of South African Species[36] to confirm the national Red List Status and Category of plant species that have been recorded in the proposed PAOI.
- The Red List of South African Plant Species[37] to confirm the national Red List Status and Category of plant species that have been recorded in the proposed PAOI.
- The International Union for the Conservation of Nature's (IUCN) Red List[38] to confirm the international Red List Status and Category of plant species that have been recorded in the proposed PAOI.

[28] https://screening.environment.gov.za/screeningtool/#/pages/welcome
[29] https://egis.environment.gov.za/sa_national_land_cover_datasets
[30] http://bgis.sanbi.org/SpatialDataset/Detail/6715
[31] http://bgis.sanbi.org/SpatialDataset/Detail/641
[32] http://bgis.sanbi.org/SpatialDataset/Detail/670
[33] https://posa.sanbi.org/sanbi/Explore
[34] https://vmus.adu.org.za/
[35] https://www.gbif.org/
[36] http://speciesstatus.sanbi.org/
[37] http://redlist.sanbi.org/index.php
[38] https://www.iucnredlist.org/

4.2.5.2 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 by the DFFE Online ST, and land-use as described by the SANLC (2020).

An additional site visit was conducted (10 – 16 March 2024) to conduct terrestrial biodiversity surveys to determine species presence and distribution on site in correlation with the Scoping Phase project layout.

4.2.5.3 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.

4.2.6 AVIFAUNA

4.2.6.1 SCREENING STUDY

As part of the protocol a Screening Site Assessment of the proposed Hugo WEF was undertaken. This was carried out in summer (February) 2022, to determine if the site had any fatal flaws from an avian perspective. This was required as the site lies outside any of the Renewable Energy Development Zones (REDZs).

The study took place over two days (9-11 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 added). This allowed an initial snap-shot avian survey of the proposed Hugo WEF in the Cape Fold mountains south of De Doorns. Short Vantage Point observations of 1-2 hours were undertaken, whilst driving and walking all areas of the proposed Hugo site.

4.2.6.2 PRE-CONSTRUCTION AVIFAUNAL MONITORING

In accordance with the Best Practice guidelines for assessing and monitoring the impact of wind energy facilities on birds in southern Africa (Jenkins et 2015), four seasonally timed site visits across the entire 8,184 ha study area were undertaken to record all flights and heights of Priority species.

A 12-month monitoring programme for the developable area was undertaken. The report and monitoring programme followed the "Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Avifaunal Species by Onshore Wind Energy Generation Facilities where the Electricity Output is 20 Megawatts or More" (Government Gazette 43110, GN 320, 20 March 2020).

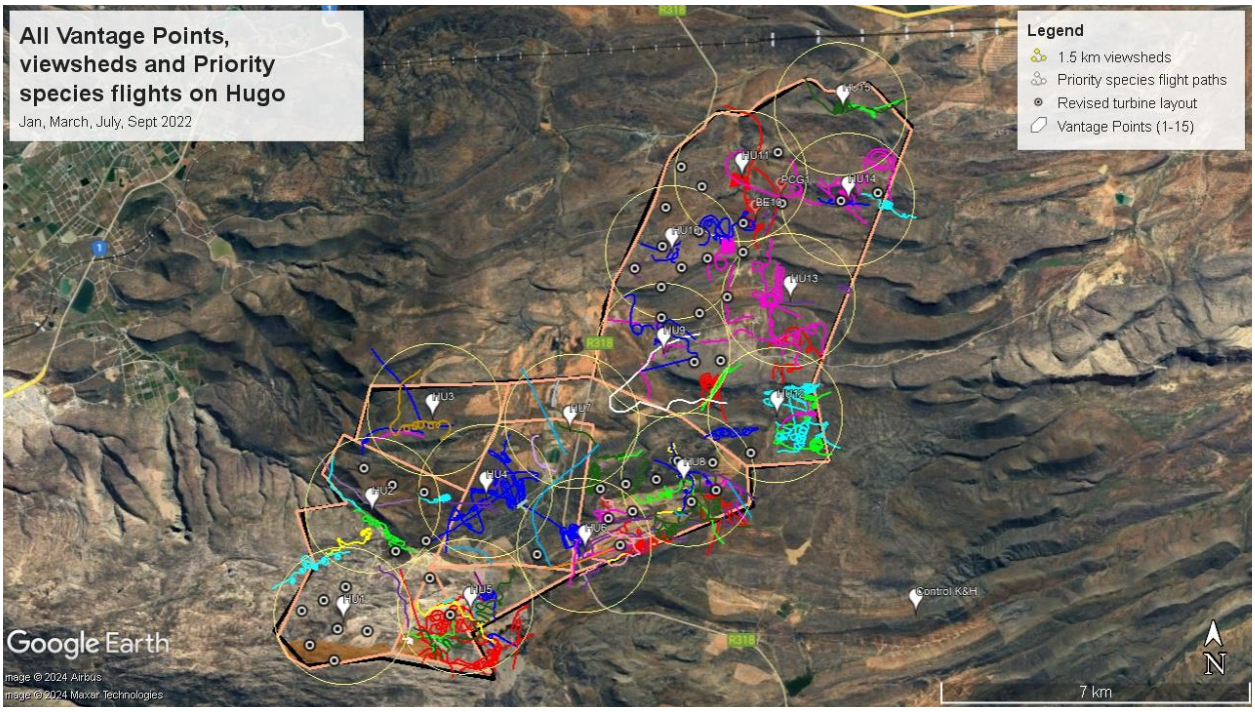
All areas were covered, and species flights recorded, these are shown in Figure 4-2 below. Methods for the Vantage Point (VP) monitoring were undertaken according to the BARESG monitoring protocols (Jenkins et al. 2015).

4.2.6.3 VANTAGE POINT SURVEYS

VP observations are the most important form of data collection for avifaunal surveys on wind farms (Jenkins et al., 2015). To cover the full extent of the proposed site whilst ensuring minimal overlap between VPs, a total of 15 VPs, each within a 1.5 km viewshed, were overlayed on the proposed study site. Subject to weather conditions, each VP was surveyed over three days in six-hour sessions (18-hours in total per VP) during either early morning or afternoon hours to ensure that the full range of bird-active hours was monitored.

“Priority” species are defined as the top 100 most collision-prone species (Ralston-Paton et al., 2017). On site, when a Priority species is identified, the flight height and behaviour are recorded every 15 seconds until the bird leaves the VP viewshed or lands. Flight paths are drawn onto printed A3 maps with associated variables recorded on the reverse of the data sheets. These include species, number of individuals, age, sex, flight duration, flight height in metres at 15 second intervals, flight behaviour, and habitat details. Flight paths and associated data are later transcribed into digital format for further mapping and analysis. Examples of the flights of all Priority species are shown in Figure 4-2 and are undertaken over four equally spaced seasons for the proposed Hugo WEF. This approach ensured that all biologically important periods were covered: summer for full complement of migrants, autumn for migration, winter for start of the breeding season for large eagles, and spring for the breeding of most other species (harriers, cranes).

FIGURE 4-2 THE PROPOSED HUGO WIND ENERGY FACILITY, INDICATING ALL VANTAGE POINTS (= WHITE BALLOONS), ASSOCIATED 1.5-KM VIEWSHEDS (= YELLOW CIRCLES), AND THE REVISED (42) TURBINE POSITIONS (= SMALL BLACK/WHITE CIRCLES)



4.2.6.4 COLLISION RISK MODELLING (CRM)

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 energy facility 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.

Collision Risk Modelling 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 energy facility in southern Africa, across a suite of collision-prone species identified on site.

4.2.6.5 GENERAL RISK ANALYSIS

The following variables were used to inform the CRM:

- Flight density (Passage Rates of flights per hour for each species);
- Flight heights (proportion of time spent within the blade-swept (BSA) or risk area);
- Habitats;
- Proposed turbine specifications;
- Topography (some raptors use slope and lift in their daily flights); and
- Seasonality (temporal use).

The result is a quantitative prediction of high-risk flights, presented as a proportion of time spent within the BSA. These are presented as classes from 1 (lowest risk) to 8 (highest risk).

4.2.6.6 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); and
- The turbine collision propensity of individual species derived from empirical data provided from South African Wind energy facility 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.

4.2.7 BATS

Desktop Investigation

A desktop study was conducted for the site, using the information provided by the representative of the developer, as well as information gathered through a literature review. Although there are no other wind farms within a 30 km radius, other renewable energy developments were noted and consulted as appropriate. Bat species lists of nearby proposed wind farms, which is the closest wind farm applications, were consulted and compared to Hugo WEF.

We value local knowledge and discussing the bat situation with people who are familiar with the area and seasonal changes, could provide valuable knowledge and input into the process. Therefore, interviews were conducted with the landowners staying permanently on the farm.

Passive Acoustic Monitoring Systems

The monitoring systems consisted of six Wildlife Acoustics SM4BAT full spectrum bat detectors that were powered by 12V, 7Amp-h sealed lead acid batteries replenished by photovoltaic solar panels. Two SanDisk memory cards, class 10 speed, with a capacity of 64 Gigabyte (GB) or 128 GB each, were utilised within each detector to ensure substantial memory space with high-quality recordings, even under conditions of multiple false environmental triggers.

Each detector was set to operate in continuous trigger mode from dusk each evening until dawn. Times were correlated with latitude and longitude and set to trigger half an hour before sunset and half an hour after sunrise. The trigger mode setting for the bat detectors, which record frequencies exceeding 16 kHz and -18 dB, was set to record for the duration of the sound and 1000 m/s after the sound ceased; this period is known as the trigger window.

The data from these recorders was downloaded over three to four-month intervals and analysed to provide an approximation of the bat frequency and species diversity that visit and inhabit the site during the periods of monitoring (refer to Volume II for summary of passive detectors deployed at the proposed Hugo WEF).

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.

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 14-months and limitations of the bat monitoring study no day roosts were discovered.

Data Analysis

Data were downloaded manually approximately once every three to four months. Acoustic files downloaded from the detectors were analysed for bat activity and possible bat species. Wildlife Acoustics Kaleidoscope 5.4.3 was used for analysing large quantities of data. In cases where there was uncertainty about the details of a call, but it was clear that it was a bat call, the call was classified as Unclear.

Various Sources of Information

Various sources of information have been used to compile inform the Bat Assessment Report. Source of information is further discussed in Volume II, Section 3.3.4.

4.2.8 HERITAGE AND ARCHAEOLOGY

A desk-based review of available literature was carried out prior to the field survey to assess the general heritage context into which the development would be set. Maps and aerial photographs were sourced from Google Earth and Geo-spatial Information applications. Background data specific to the site were sourced from the South African Heritage Resources Information System (SAHRIS). Data was also collected via a field survey by two archaeologists subjected to a detailed foot survey between 8 and 11 April 2024.

4.2.9 PALEONTOLOGY

A paleontological impact assessment (PIA) was commissioned from Dr Marion Bamford of the University of the Witwatersrand as part of the HIA. The PIA has been included in Volume II.

The PIA comprised a desktop review of relevant paleontological and geological mapping for the area and the relevant sheet explanations.

Relevant literature, paleontological databases, and published and unpublished records were consulted to determine the likelihood of fossils occurring in the affected area. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases.

The desktop study was used to determine the impact significance of the Hugo WEF on paleontological resources.

4.2.10 VISUAL/LANDSCAPE

The study 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 NASA in the form of a 30 m SRTM (Shuttle Radar Topography Mission) elevation model.

The following VIA-specific tasks have been undertaken:

Determine potential visual exposure

The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if (or where) the proposed facility and associated infrastructure were not visible, no impact would occur.

The viewshed analyses of the proposed facility and the related infrastructure are based on a 30 m SRTM digital terrain model of the study area.

The first step in determining the visual impact of the proposed facility is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure are taken into account.

Determine visual distance/observer proximity to the facility

In order 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 this type of structure.

Proximity radii for the proposed infrastructure are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed facility.

Determine viewer incidence/viewer perception (sensitive visual receptors)

The next layer of information is the identification of areas of high viewer incidence (i.e. main roads, residential areas, settlements, etc.) that would be exposed to the project infrastructure.

This is done in order to focus the attention on areas where the perceived visual impact of the facility will be the highest and where the perception of affected observers will be negative.

Related to this dataset, is a land use character map, that further aids in identifying sensitive areas and possible critical features (i.e. tourist facilities, national parks, etc. – if applicable), that should be addressed.

Determine the visual absorption capacity (VAC) of the landscape

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

Calculate the visual impact index

The results of the above analyses are merged in order to determine the areas of likely visual impact and where the viewer perception would be negative. An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focusses the attention to the critical areas of potential impact and determines the potential magnitude of the visual impact.

GIS software will be used to perform all the analyses and to overlay relevant geographical data sets in order to generate a visual impact index.

Determine impact significance

The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section is displayed in impact tables and summarised in an impact statement.

Propose mitigation measures

The preferred alternative (or a possible permutation of the alternatives) will be based on its potential to reduce the visual impact. Additional general mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project.

Reporting and map display

All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment and the conclusion of the assessment will be addressed in this VIA report.

Site visit and photo simulations

A site visit was undertaken on the 6th September 2023 in order to verify the results of the spatial analyses and to identify any additional site-specific issues that may need to be addressed in the 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.

Photographs from strategic viewpoints were taken in order to simulate realistic post construction views of the WEF. This aids in visualising the perceived visual impact of the proposed WEF and place it in spatial context.

4.2.11 NOISE

This study considered local regulations and both local and international guidelines, using the terms of reference proposed by SANS 10328:2008 for a comprehensive Environmental Noise Impact Assessment (‘ENIA’) and as proposed by the requirements specified in the Assessment Protocol for Noise that were published on 20 March 2020, in Government Gazette 43110, GN 320. The study also considered the noise limits as proposed by IFC which is based on studies completed by the World Health Organization (‘WHO’).

Ambient sound levels were measured previously in areas with a similar developmental character. The data indicate ambient sound levels are generally low, with faunal and other natural sounds as the main source of noise in the area. Wind-induced noises influence ambient sound levels during periods with increased winds, with the ambient sound levels determined by numerous factors (vegetation type and density, faunal species in the area, etc.).

Due to a few wind turbines proposed within an area with a potential high sensitivity to noise, a full environmental noise impact study was be conducted. The initial assessment was a desktop study and was assessed in terms of the Noise Sensitivity Theme using the National Web-based Environmental Screening Tool. Basic predictive models were also used to identify potential issues of concern.

Residential areas and potential noise-sensitive developments/receptors/communities (NSR) were identified using aerial images up to 2,000 m (recommendation SANS 10328:2003) from potential turbine locations. The statuses of these structures were verified during the site in December 2022 and September 2023 during periods with low winds. The ambient sound levels were measured in terms of Government Notice Regulation 320 of March 2020.

4.2.12 SOCIO-ECONOMIC

The approach to the 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 international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), the settlements, and communities likely to be affected by the proposed project.
- Collecting baseline data on the current social and economic environment.
- Identifying the key potential social issues associated with the proposed project. This requires a site visit to the area and consultation with affected individuals and communities. As part of the process a basic information document was prepared and made available to key interested and affected parties. The aim of the document was to inform the affected parties of the nature and activities associated with the construction and operation of the proposed development to enable them to better understand and comment on the potential social issues and impacts.
- Assessing and documenting the significance of social impacts associated with the proposed intervention.
- Identifying alternatives and mitigation measures.

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.
- Site visit and interviews with key stakeholders.
- Identifying the key potential social issues associated with the proposed project.
- Assessing the significance of social impacts associated with the proposed project.
- Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

4.2.13 TRAFFIC AND TRANSPORTATION

- Evaluate the impacts of additional traffic generated by the proposed development on the existing road network in the immediate vicinity of the development;
- Determine the specific traffic needs during different phases of implementation, namely construction and installation, decommissioning and operation;
- Evaluate intersection capacity of the road network and recommend mitigation measures;
- Evaluate site access requirements (including site distance assessment if required);
- Confirm the associated clearances required for the necessary equipment to be transported from the point of delivery to the proposed site based on information on equipment provided by the Client;
- Confirm transport requirements during construction, operation and maintenance;
- Provide a high-level transport plan for the transportation of equipment to site; and
- Determine (Abnormal) Permit requirements, if any.

4.3 IDENTIFICATION OF POTENTIAL IMPACTS

The identification 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 addressed in the EIA 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.

4.3.1 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).

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, were 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.

The 7-Step approach for determining the significance of impacts pre, and post mitigation, is described below:

Step 1: Predict potential impacts by means of an appraisal of:

- Site Surveys;
- Project-related components and infrastructure;
- Activities related with the project life-cycle;
- The nature and profile of the receiving environment and potential sensitive environmental features and attributes;
- Input received during public participation from all stakeholders; and
- The relevant legal framework applicable to the proposed development

Step 2: Determination of whether the potential impacts identified in **Step 1** will be *direct* (caused by construction, operation, decommissioning or maintenance activities on the proposed development site or immediate surroundings of the site), *indirect* (not immediately observable or do not occur on the proposed development site or immediate surroundings of the site), *residual* (those impacts which remain after post mitigation) and *cumulative* (the combined impact of the project when considered in conjunction with similar projects in proximity).

Step 3: Description and determination of the significance of the predicted impacts in terms of the criteria below to ensure a consistent and systematic basis for the decision-making process. Significance is numerically quantified on the basis score of the following impact parameters:

***Extent* ®** of the impact: The geographical extent of the impact on a given environmental receptor.

***Duration* (D)** of the impact: The length of permanence of the impact on the environmental receptor.

***Reversibility* ® of the impact**: The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change

***Magnitude* (M)** of the impact: The degree of alteration of the affected environmental receptor.

***Probability* (P)** of the impact: The likelihood of the impact actually occurring.

A widely accepted numerical quantification of significance is the formula:

S=(E+D+R+M)*P

Where: *Significance=(Extent+Duration+Reversibility+Magnitude)*Probability*

The following has also been considered when determining the significance of a potential impact.

Nature (N) of the impact: A description of what causes the effect, what will be affected, and how it will be affected.

Status (S) of the impact: described as either positive, negative or neutral

Cumulative impacts.

Inclusion of **Public comment.**

The significance of environmental impacts is determined and ranked by considering the criteria presented in Table 4-2 below. All criteria are rank according to 'Very Low', 'Low', 'Moderate', 'High' and 'Very High' and are assigned scores of 1 to 5 respectively.

TABLE 4-2 DEFINING THE SIGNIFICANT IN TERMS OF THE IMPACT CRITERIA.

Impact Criteria	Definition	Score	Criteria Description
Extent (E)	Site	1	Impact is on the site only
	Local	2	Impact is localized inside the activity area
	Regional	3	Impact is localized outside the activity area
	National	4	Widespread impact beyond site boundary. May be defined in various ways, e.g. cadastral, catchment, topographic
	International	5	Impact widespread far beyond site boundary. Nationally or beyond
Duration (D)	Immediate	1	On impact only
	Short term	2	Quickly reversible, less than project life. Usually up to 5 years.
	Medium term	3	Reversible over time. Usually between 5 and 15 years.
	Long term	4	Longer than 10 years. Usually for the project life.
	Permanent	5	Indefinite
Magnitude (M)	Very Low	1	No impact on processes
	Low	2	Qualitative: Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.
	Moderate	3	Quantitative: No measurable change; Recommended level will never be exceeded.

Impact Criteria	Definition	Score	Criteria Description
	High	4	Qualitative: Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration.
	Very High	5	Quantitative: Measurable deterioration; Recommended level will occasionally be exceeded.
Reversibility (R)	Reversible	1	Qualitative: Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration, or disturbance of important processes.
	Recoverable	3	Quantitative: Measurable deterioration; Recommended level will often be exceeded (e.g. pollution)
	Irreversible	5	Permanent cessation of processes
Probability (P)	Improbable	1	Recovery which does not require rehabilitation and/or mitigation.
	Low Probability	2	Recovery which does require rehabilitation and/or mitigation.
	Probable	3	Not possible, despite action. The impact will still persist, and no mitigation will remedy or reverse the impact.
	Highly Probable	4	Not likely at all. No known risk or vulnerability to natural or induced hazards
	Definite	5	Unlikely; low likelihood; Seldom; low risk or vulnerability to natural or induced hazards

The significance (s) of potential impacts identified according to the criteria above has been colour coded for the purpose of comparison. This colour coding will be used in impact tables.

Significance is deemed Negative (-)			Significance is deemed Positive (+)		
0 – 30	31 – 60	61 – 100	0 – 30	31 – 60	61 – 100
Low	Moderate	High	Low	Moderate	High

Step 4: Determination of practical and reasonable mitigation measures based on specialists' inputs and field observations following the mitigation hierarchy (avoid, minimise, manage, mitigate, or rehabilitate).

Step 5: Evaluation of predicted residual impacts after implementation of mitigation measures.

Step 6: Determination of the significance of the impact taking into consideration the predicted residual impacts after implementation of mitigation measures.

Step 7: Based on an acceptable significance of the impact, determination of the need and desirability of the proposed development and an opinion as to whether the development should proceed or not.

The Assessment of the significance of potential impacts is then populated in an Impact Summary Table, see Section 10 and Section 11 of this Report for the specialists' impact assessments.

4.3.2 MITIGATION

The EIA proposes measures to avoid, reduce or remedy significant adverse impacts which were identified; these are termed mitigation measures. Where the assessment process identified any significant adverse impacts, mitigation measures were proposed to reduce those impacts where practicable. Such measures include the physical design evolutions such as movement of turbines and management and operational measures. Design alterations such as relocating turbines 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 and enhancement measures (where relevant).

4.3.3 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 has included all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 30 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 have been updated as applicable through the EIA process.

A preliminary assessment of cumulative impacts has been made in the Scoping Phase and has been assessed further in this EIA Phase (Section 10).

5. NEED AND DESIRABILITY

Reference is made to the DFFE 2017 Guideline on Need and Desirability, 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 desirability can be equated to wise use of land – i.e. the question of what is the most sustainable use of land*."

The Need and Desirability of the proposed development has been considered in terms of the regional location and the project's cumulative impact. The guidelines pose questions that should be considered in this investigation, which are addressed in the Table 5-1 and Table 5-2 below.

TABLE 5-1 ECOLOGICAL CONSIDERATIONS OF NEED AND DESIRABILITY FOR THE HUGO WEF

"securing ecological sustainable development and use of natural resources"[39]			
Question		Answer	Reference
How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?		Through effective implementation of suggested mitigation and avoidance measures, it is unlikely that the development of the Hugo Wind Energy Facility would significantly compromise the long-term ecological integrity and associated ecosystem services of the site.	Volume II: Terrestrial Biodiversity Impact Assessment
How were the following ecological integrity considerations taken into account?	*Threatened Ecosystems*	The proposed development area includes no threatened ecosystems as verified through the IUCN Red List of Ecosystems conservation tool.	Volume II: Terrestrial Biodiversity Impact Assessment
	Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure	An ecological sensitivity map of the site was produced by integrating information collected on-site with available ecological and biodiversity information. Sensitive features such as wetlands, drainage lines, water bodies, steep slopes and rocky outcrops were mapped and appropriately buffered. The proposed layout avoids all high-sensitive areas.	Volume II: Terrestrial Biodiversity Impact Assessment, Aquatic Impact Assessment, Bat Impact Assessment, Avifaunal Impact Assessment, Faunal Impact Assessment
	Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")	The proposed Hugo WEF falls within the Matroosberg Mountain Catchment Area and Groot Winterhoek Strategic Water Source Area which are considered Ecological Support Areas (ESAs) of a Tier One status. ESAs of a Tier One status must be maintained in a functional and near natural state, however some limited habitat loss may be acceptable. These ESAs can be utilized by the development provided the underlying ecological function remains uncompromised. Therefore, appropriate mitigations have been developed for consideration. Small sections of CBAs are present on site and are regarded as Tier One CBAs. These areas cannot undergo further loss of habitat or any degradation to maintain ecosystem integrity. Therefore, none of the areas of CBA Tier	Volume II: Terrestrial Biodiversity Impact Assessment

[39]Section 24 of The Constitution of South Africa refers.

"securing ecological sustainable development and use of natural resources"[39]			
		One has been considered for development and has been listed as Highly sensitive areas that must be avoided.	
	Conservation targets	The presence of turbines in the NPAES and PA, would not compromise the ability to reach conservation targets in the area. There are no specific features of very high biodiversity value within the affected polygons and highly sensitive areas have been avoided for development. In addition, the site does not appear to fall on any significant gradients or corridors that are likely to be of high importance for biodiversity processes such as migration and faunal movement.	Volume II: Terrestrial Biodiversity Impact Assessment
	Ecological drivers of the ecosystem	Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of several other renewable energy developments (primarily solar developments which are more invasive in vegetation clearing) in the area, this is a potential cumulative impact of the development that is assessed.	Volume II: Terrestrial Biodiversity Impact Assessment
	Environmental Management Framework	The proposed Hugo WEF complies with all policies and planning tools and has no intersections with EMFs or with any development zones according to the DFFE screening tool report.	n/a
	Spatial Development Framework	The vision for the Breede Valley Spatial Development Framework is "A Breede Valley dedicated to providing efficient quality services by working in partnership with its citizens and businesses to enhance the quality of life and to create a safe, healthy and vibrant community in which to live, work, play and visit". The vision is underpinned by six key development principles (DPs), namely: • DP1: Economic Development. • DP2: Vibrant Local Tourism. • DP3: Enhanced residential character. • DP4: Accessible social and civic facilities. • DP5: Outdoor Lifestyle. • DP6: Sustainable cities and communities Development principles 1, 2, 5 and 6 are relevant to the proposed development. The SDF is informed by a set of Spatial Planning Categories (SPCs) based on the Western Cape Biodiversity Spatial Plan categories that also underpin the Provincial SDF	Volume II: Social Impact Assessment

"securing ecological sustainable development and use of natural resources"[39]			
	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	All global responsibilities to which South Africa is signatory or party to were assessed within this report. Applicable international treaties and conventions are: • UNFCCC Paris Agreement (2016) • The Equator Principles IIII (2020) • The Convention on Biological Diversity (CBD) (1993) • The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983) • The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999) The proposed development complies with all international responsibilities.	n/a
How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		The proposed development can disturb listed plant species and vegetation from clearing of the development footprint, soil erosion and alien plant invasion. Increased levels of pollution, noise, disturbance and human presence can impact negatively on faunal communities. Biodiversity value and ecological functioning of the proposed development area are potentially affected by the development. As part of the EIA process specialist studies were conducted to identify areas most environmentally suitable for development within the proposed development site boundary. As a result of these studies a development layout has been produced that avoids sensitive areas and identified constraints. The specialists have proposed mitigation measures to further reduce residual risks or enhance opportunities during construction, operation and decommissioning phases of the development. With implementation of these mitigation measures, all identified negative impacts are expected to be reduced to acceptable levels of medium or low negative significance. All mitigation measures proposed by the specialists are included in the EMPr for the project.	Volume I App B: EMPr Volume II: Specialist reports
How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?		On a national level the development will lessen the country's dependency on coal, and contribute to lowering water consumption, pollution and environmental degradation per kW of electricity produced. The EMPr provides measures for avoidance and minimisation of pollution, as well as enhancing any potential positive impacts.	Volume I App B: EMPr

"securing ecological sustainable development and use of natural resources"[39]		
What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	The generation of waste will largely be restricted to the construction phase of the project and consist of normal construction phase solid waste streams. The EMPr will detail specific mitigation measures that must be implemented for the appropriate management and minimisation of waste, during all phases of the project. Registered service providers will be utilised to transport solid waste to registered landfills.	Volume I App B: EMPr
How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Visual buffers are applied to cultural landscapes / heritage sites. The development layout is produced by avoiding turbine placement within these visual buffers. A Heritage Impact Assessment and a Visual Impact Assessment were conducted to assess the proposed layout. Comment from the relevant heritage authority has been sought. Mitigation measures have been identified by the heritage specialists to minimise and remedy residual impacts and enhance positive impacts.	Volume II: Heritage Impact Assessment & Visual Impact Assessment
How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Wind is a renewable resource and will be the 'fuel' for the WEF to generate electricity. Therefore, the development will have a minimal impact on non-renewable resources.	n/a
How will this development use and/or impact on renewable natural resources and	The WEF will use the renewable energy resource of wind to generate power. Construction of the WEF will require use of water, a renewable natural resource. Operation of the WEF will consume relatively small quantities of water when compared to alternative energy technologies such as coal. Impacts on the ecosystem caused by use of these renewable energy resources has been evaluated.	n/a

"securing ecological sustainable development and use of natural resources"[39]			
the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	*Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)*	The proposed WEF will reduce South Africa's dependency on non-renewable resources, particularly coal, as an energy source. Wind as an energy source is not dependent on water, as compared to the massive water requirements of conventional power stations, has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.	n/a
	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)	The current land use is low-intensity grazing and the land is not suitable for other agricultural uses. The proposed development will increase yield as the landowners will be paid for the use of their land. This will improve cash flow and financial sustainability of farming enterprises on site. The proposed development itself will not cause a significant change in land use, as the development site is primarily low intensity agriculture (grazing), which can still proceed once the development is constructed. Wind is a renewable resource and a wind energy facility is the best use thereof. Solar electricity generation would require a much greater infrastructure footprint to generate the equivalent energy of the proposed WEF.	Volume II: Agricultural Impact Assessment; Social Impact Assessment
	Do the proposed location, type and scale of	The proposed WEF is predicted to reduce dependency on coal as an energy source.	n/a

"securing ecological sustainable development and use of natural resources"[39]			
	development promote a reduced dependency on resources?	Wind as an energy source is not dependent on water, as compared to the massive water requirements of conventional coal fired power stations, has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.	
How were a risk-averse and cautious approach applied in terms of ecological impacts?	*What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?*	For the current Flora assessment, sampling took place in the autumn season, and conditions were relatively dry during the site visit. Most of the vegetation across the site was relatively dry and in a dormant state. As a result, some plant species were not visible at the time and only the lists of the perennial species are considered reliable. While this poses some limitations for the study, the different habitats present could still be easily discerned based on the vegetation present and this is not likely to significantly affect the sensitivity mapping of the site or the characterisation of the plant communities present. To limit the gaps in the Flora assessment, the detailed site visits were done in conjunction with a desktop study. Many fauna are difficult to observe in the field and their potential presence at a site must be evaluated based on the literature and available databases. However, many remote areas have not been well-sampled with the result that the species lists derived for such areas do not always adequately reflect the actual fauna present. In order to reduce this limitation, and ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study site and are likely to include a much wider array of species than actually occur at the site. In addition, the camera trapping that was conducted at the site provides a reliable baseline and an actual indication of the fauna present and their levels of activity and distribution across the site. This is considered to be a cautious and conservative approach to the assessment and is considered significantly more reliable and robust than relying on available information alone, especially for such a poorly known area. Through camera trapping, Riverine Rabbit was also identified to be present on the site.	Volume II: Fauna and Flora Impact Assessment
	What is the level of risk associated with the limits of current knowledge?	The risk associated with assumptions and limits of current knowledge is the potential for information being assessed to be incorrect. This would translate to erroneous impact identification and mitigation measures. However, due to the amount of site work conducted the risk associated with this is considered to be low.	n/a

"securing ecological sustainable development and use of natural resources"[39]			
	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	To counter the likelihood that the area has not been well sampled in the past and in order to ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study area and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative approach which takes the study limitations into account. The precautionary approach has been adopted for this study, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts	Volume II: Terrestrial Biodiversity Impact Assessment
How will the ecological impacts resulting from this development impact on people's environmental right in terms following:	*Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?*	Impacts on people's rights have been identified and assessed by the social specialist, visual specialist and noise specialist. The visual specialist identified no go areas and areas most visually suitable for development. The significance of the potential negative health risks posed by the development (noise, shadow flicker, electromagnetic radiation) is expected to be moderate to low. The noise impact assessment found the level of noise impacts for the Hugo WEF are expected to be of low significance with mitigation. The operational impact on the sense of place is expected to be of low negative significance with or without mitigation.	Volume II: Visual Impact Assessment; Social Impact Assessment; Noise Impact Assessment
	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Renewable energy has fewer negative health effects than other forms of non-renewable energy generation and will have overall positive health benefits.	Volume II: Social Impact Assessment
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-		The SIA conducted for the proposed Hugo WEF indicates that during the construction and the operational phase of the proposed development project, various employment opportunities, with different levels of skills will be created. In addition, this will also create local business opportunities benefitting the socio-economic development of the local communities. The proposed development also represents an investment in clean, renewable	Volume II: Social Impact Assessment

"securing ecological sustainable development and use of natural resources"[39]		
economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole.	
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The ecology, avifauna, bat and aquatic specialists have all concluded that the development does not have unacceptable negative impacts that cannot be mitigated to a low or medium level of significance, if recommended mitigation levels are adhered to. All turbines should be feathered by 90-degree feathering of blades below the manufacturer's cut-in speed, so it is exactly parallel to the wind direction; therefore, no freewheeling blade rotation should occur, without locking the blades. Turbine positions were removed from bat sensitive areas to incorporated the bat specialist recommendations.	Volume II: Specialist Reports
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Iterative specialists' constraints mapping identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies further informed the development of the preferred layout.	Volume II: Specialist Reports
Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	The cumulative impacts assessed for terrestrial biodiversity is the broad-scale change in ecological processes due to vegetation clearing impacts in the broader area. Within 30 km of the development, roughly five solar Photovoltaic developments are under consideration. Solar PV developments are more invasive in vegetation clearing and this impact can create habitat fragmentation in the broader area, as well as put species of conservation concern at risk. This potential impact will be minimized through active collaboration with the various developments in the area.	Volume II: Terrestrial Biodiversity Impact Assessment

TABLE 5-2 SOCIO-ECONOMIC CONSIDERATIONS OF NEED AND DESIRABILITY FOR THE HUGO WEF

"Promoting justifiable economic and social development"[40]			
Question		**Answer**	**Reference**
What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	**Breede Valley Municipality Integrated Development Plan** The vision of the Breede Valley Municipality (BVM) is a 'A unique and caring Valley of service excellence, opportunity, and growth'. The mission statement linked to the vision is 'To be a South African care capital by providing sustainable and affordable basic services in a safe and healthy environment, which promotes social and economic welfare through participative governance in a committed service-orientated approach and appreciates committed staff as the organisation's most valuable resource and key to service delivery'. The IDP lists 6 strategic objectives (SOs) that inform the vision, namely: • SO1: To provide and maintain basic services and ensure social upliftment of the Breede Valley community. • SO2: To create an enabling environment for employment and poverty eradication through proactive economic development and tourism. • SO3: To ensure a safe, healthy, clean, and sustainable external environment for all Breede Valley's people. • SO4: To provide democratic, accountable government for local communities and encourage involvement of communities and community organisations in the matters of local government. • SO5: To ensure a healthy and productive workforce and an effective and efficient work environment. • SO6: To assure a sustainable future through sound financial management, continuous revenue growth, corporate governance, and risk management practices. **Western Cape Infrastructure Plan** The Western Cape Infrastructure Framework (WCIF) (2013) was developed by the WCP Provincial Department of Transport and Public Works in terms of the Provincial Government's mandate to coordinate provincial planning under Schedule 5A of the Constitution. The objective of the WCIF is to align the planning, delivery and management of infrastructure to the strategic agenda and vision for the province, as	Volume III; Social Impact Assessment

[40] Section 24 of The Constitution of South Africa refers.

"Promoting justifiable economic and social development"[40]			
		outlined in the 2009-2014 Draft Provincial Strategic Plan. The One Cape 2040 and 2013 Green is Smart strategy were other key informants. The document notes that given the status quo of infrastructure in the province, and the changing and uncertain world facing the Western Cape over the 2-3 decades a new approach to infrastructure is needed. Namely one that satisfies current needs and backlogs, maintains the existing infrastructure, and plans proactively for a desired future outcome. The 2040 vision requires a number of transitions to shift fundamentally the way in which infrastructure is provided and the type of infrastructure provided in WCP. The WCIF addresses new infrastructure development under five major 'systems' (themes), and outlines priorities for each. Energy is one of the 'systems' identified. The document notes that a provincial demand increase of 3% per year is anticipated for the period 2012-2040. Key priorities are in matching energy generation/ sourcing with the demand needed for WCP economic growth. Additionally, the energy focus should be on lowering the provincial carbon footprint, with an emphasis on renewable and locally generated energy. Three key transitions are identified for the WCP Energy 'system' infrastructure, namely: • Shifting transport patterns to reduce reliance on liquid fuels. • Promoting natural gas as a transition fuel by introducing gas processing and transport infrastructure. • Promoting the development of renewable energy plants in the province and associated manufacturing capacity.	
	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The current land use is primarily used for agriculture, with no other land use planned or occurring. No tourism or commercial hunting is associated with any of the site properties. Western Cape Green Economy Strategy Framework The Western Cape Green Economy Strategy (2013) – 'Green is Smart' - is a framework for shifting the Western Cape economy from its current carbon intensive and resource-wasteful path within a context of high levels of poverty to one which is smarter, greener, more competitive, and more equitable and inclusive. The Strategy is closely aligned with provincial development goals and the 2014 WCCCRS. The Strategy's point of departure is that while the WCP faces significant challenges in terms of climate change and economic development. Two of	

"Promoting justifiable economic and social development"[40]			
		the WCP's key economic sectors - both of national importance - agriculture and tourism, are vulnerable to climate change. At the same time, these challenges hold significant potential for opportunities linked to attracting investment, economic development, employment creation, and more resilient infrastructure and patterns of consumption. These opportunities are partly linked to the WCP's existing leadership in some fields of green technology, including knowledge services. The core objective of the Strategy is to position the WCP as the lowest carbon footprint province in South Africa, and a leading green economy hub on the African continent. The Strategy framework is made up of 5 drivers of the green economy which are market focused and principally private sector driven and supported by 5 enablers which are either public sector driven, or the product of a collaborative effort. The five drivers are: smart mobility, smart living and working, smart ecosystems, smart agri-processing and smart enterprise. The relevant cross-cutting enablers are: finance, rules and regulations, knowledge management, capabilities, and infrastructure. The framework also identifies priorities that would position the WCP as a pioneer and early adopter of green economic activity. These priorities have been identified in terms of the WCP being firstly, a front-runner or pioneer and secondly, an early adopter of innovations and technologies which already exist but are not widely adopted in South Africa. Some priorities are considered game-changers and are singled out as 'high level priorities for green growth'. Three such 'high level priorities for green growth' are identified, two of which are of relevance here: Natural Gas and Renewables: Off-shore natural gas, potential gas baseload power plants and renewable energy IPP programme, together with a greenfield gas infrastructure, will be the game-changer for the Western Cape to be the lowest carbon province in South Africa, and achieve significant manufacturing investment. Green Jobs: A green growth path without job growth is unsustainable. There must be early pursuit of priorities with a high rate of job growth potential – notably rehabilitation of natural assets, responsible tourism and the waste sector.	

"Promoting justifiable economic and social development"[40]			
		'Under the section dealing with drivers, renewable energy is discussed under 'Smart Enterprise'. The WCP's objective in terms of this driver is to establish the WCP as a globally recognized centre of green living, working, creativity, business, and investment, and thereby attract investment, business and employment opportunities. Based on existing comparative advantages, three key opportunities are identified, one of which is of relevance here, namely, to establish the WCP as Africa's new energy servicing hub. In this regard, the Strategy document notes that WCP is well placed to be the most important research and servicing hub for the renewable and natural gas energy sectors in South Africa and on the African continent. The Strategy also notes that there are important initial opportunities in the construction of new energy infrastructure. However, the real long-term benefits lie in the servicing of operational infrastructure. In this regard, it is estimated that the annual servicing and maintenance costs of WEFs for instance amount to approximately 10% of the initial capital investment. Public and market sector procurement are identified as some of the key enablers. The creation of a streamlined regulatory system – the reduction of 'red tape' – is identified as a key prerequisite for creating an enabling environment. Under the section dealing with enablers necessary to unlock development potential, renewable energy is discussed under "Smart Infrastructure". The Strategy document notes that existing infrastructure systems, particularly those relating to energy and transport, are carbon intensive, with high costs to the environment. Opportunities for the WCP are linked to tapping into infrastructural development funding by leveraging existing advantages. With regard to the energy sector, the Strategy proposes that the WCP becomes an early adopter of natural gas processing and transport infrastructure and become the hub of Concentrated Solar manufacture and servicing. Natural gas is identified as the key potential 'game changer' of the WCP economy, and at present the best way to transition the economy to a more fully integrated renewables sector as major part of the WCP fuel mix in the long term. In this regard, the relative ease with which gas-fired	

<table>
<tr><th colspan="4">“Promoting justifiable economic and social development”[40]</th></tr>
<tr><td></td><td></td><td>stations could be activated make them an ideal supplement to less predictable wind and solar sources.

Surprisingly, WEF and Solar PV manufacture and servicing receive no specific mention, while Concentrated Solar (CSP) does. The Strategy document justly notes that while the Northern Cape Province is the best suited for CSP facilities, the WCP has strong existing research capabilities in CSP at the University of Stellenbosch (US), and the WCP’s existing manufacturing sector already has the capacity to manufacture many CSP components.

Potential opportunities of commercialisation of CSP technology for local (RSA, Africa) conditions based on US research could be substantial. This subsector is identified as an important area of collaboration between the two provinces to realise the potential benefits (p 41). The key action at this stage to initiate a WCP manufacturing and servicing centre is to lobby for support for a pilot of South African designed CSP technologies, adapted to SA conditions (p. 43).</td><td></td></tr>
<tr><td></td><td>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</td><td>The current land use is primarily used for livestock farming, irrigated fodder cropping and the cultivation of apricots. A sheep farming operation matched to sustainable natural carrying capacity of the property is being developed. The adjacent properties are used for farming, conservation, and tourism purposes.</td><td></td></tr>
<tr><td></td><td>Municipal Economic Development Strategy (“LED Strategy”).</td><td>The IDP highlights the importance of prioritising infrastructure development as economic enabler for economic development. The importance to supporting SMMEs is also noted. The provision of energy infrastructure, such as the proposed renewable energy facility, supports this programme and will create opportunities to support SMMEs.</td><td></td></tr>
<tr><td colspan="2">Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</td><td>Social impacts related to the construction phase:<table><tr><th>Impact</th><th>Significance No Mitigation/Enhancement</th><th>Significance With Mitigation/Enhancement</th></tr><tr><td>Creation of employment</td><td>Medium (Positive)</td><td>Medium (Positive)</td></tr></table></td><td></td></tr>
</table>

"Promoting justifiable economic and social development"[40]

and business opportunities		
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

Social impacts related to the operational phase:

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement

"Promoting justifiable economic and social development"[40]

Establishment of infrastructure to improve energy security and support renewable sector	High (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Low (Positive)	Medium (Positive)
Benefits associated with socio-economic contributions to community development	Medium (Positive)	Medium (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Impact on property values	Medium (Negative)	Low (Negative)
Impact on tourism	Medium (Negative)	Low (Negative)

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.

"Promoting justifiable economic and social development"[40]			
	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	The proposed development will contribute towards local economic development and skills development programs of the local and district municipality through the support and co-operation between public and private sectors, creation of employment and business opportunities, and the opportunity for skills development and on-site training during both construction and operation phases. An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard Independent Power Producers (IPPs) are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward Socio-economic Development (SED) initiatives. These contributions are linked to Community Trusts and accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education, and skills development. Community Trusts provide an opportunity to generate a steady revenue stream that is guaranteed for a 20-year 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.	Volume II: Social Impact Assessment
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?		The proposed development will contribute towards the local economic development strategies of the local and district municipality through the creation of employment and business opportunities, and the opportunity for skills development and on-site training during the construction, operation and decommissioning phase. The REIPPPP also contributes to Broad Based Black Economic Empowerment (BBBEE) and the creation of black industrialists. In this regard, Black South Africans own, on average, 34% of projects that have reached financial close (BW1-BW4), which is 4% higher than the 30%	Volume II: Social Impact Assessment

"Promoting justifiable economic and social development"[40]			
		target. This includes black people in local communities that have ownership in the IPP projects that operate in or near their communities and represents the majority share of total South African Entity Participation.	
Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?		Wind energy facilities are socially and economically sustainable in the short and long term. IPP projects require a minimum ownership of 2.5 % by local communities which represents a significant injection of capital into mainly rural areas of South Africa for the lifespan of the facility. In addition, local content minimum thresholds result in a substantial stimulus for establishing local manufacturing capacity.	Volume II: Social Impact Assessment
In terms of location, describe how the placement of the proposed development will:	result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	The construction phase will extend over a period of approximately 18-24 months and create in the region of 200-250 employment opportunities. Members from the local communities in the area, including De Doorns and Touws River, would be able to qualify for percentage of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. The typical lifespan of WEFs is 20 to 25 years. During the operational phase there will be a significant decrease in employment opportunities. The operational phase of the proposed project will create in the region of 20 full time employment opportunities during the operational phase. Typical employees that might be required include: Technicians, electricians, engineers, IT specialists, environmental specialists, health and safety managers, and administrators (skilled); drivers and equipment operators (semi-skilled); construction workers and security staff (low-skilled). The recruitment process and the requirements for each skill level and each employment opportunity need to be clearly communicated to local communities to ensure that no unrealistic expectations are created.	Volume II: Social Impact Assessment;
	reduce the need for transport of people and goods,	The need for transport of people and goods will be increased during the construction phase. Lower per capita carbon footprints are predicted due to the commercial forms of transport that will be employed to move the workforce (e.g. public transport, contractor buses).	Volume II: Traffic Impact Assessment;

"Promoting justifiable economic and social development"[40]			
	result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),	Not applicable.	n/a
	compliment other uses in the area,	Local communities and their service providers will benefit from the socio-economic development provided by the WEF and current land use will be able to continue.	Volume II Social Impact Assessment;
	be in line with the planning for the area,	The proposed WEF is in line with applicable international, national, provincial and local planning strategies.	Volume II Social Impact Assessment
	for urban related development, make use of underutilised land available with the urban edge,	The proposed development occurs away from the urban edge.	n/a
	optimise the use of existing resources and infrastructure,	• Wind energy is a renewable, clean resource and reduces pollution and the reliance on non-renewable fossil fuels and water for electricity generation. • Existing access roads will be utilised wherever possible. • It is expected that any construction water required will be delivered by tankers. • Waste removal will be in accordance with best practice by qualified waste removal contractors to the nearest registered landfill. • Portable sanitation facilities will be utilised during construction, so that no connection to the local sewerage system will be required. • Any additional infrastructure required will be constructed by the developer.	n/a

"Promoting justifiable economic and social development"[40]			
	opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	No opportunity costs in terms of bulk infrastructure expansions in non-priority areas are predicted due to the proposed development. The proposed WEF is not located within a bulk infrastructure expansion area.	n/a
	discourage "urban sprawl" and contribute to compaction/densification,	Not applicable as the proposed development site lies outside of urban areas.	n/a
	contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	The project will contribute to economic and infrastructure development in the Western Cape Province, in line with the Langeberg Integrated Development Plan.	n/a
	encourage environmentally sustainable land development practices and processes,	Construction of the renewable energy Hugo WEF project will assist South Africa in transitioning from a carbon-intensive resource use economy to a sustainable low carbon footprint economy. Sustainable land development is an overarching aspect of the proposed project development.	n/a
	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral	• Feasibility of access for wind turbine delivery, the site is easily accessible from the national road; • Close proximity to the Eskom grid with available evacuation capacity; • Viable wind resource, therefore suited to wind farm development; • The proposed site is agricultural land and current land use is low intensity gazing; and • Willingness of landowners to host a wind farm on their properties.	Section 7.2: Site Alternatives

"Promoting justifiable economic and social development"[40]			
	resource, access to the port, access to rail, etc.),		
	the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The proposed development will create jobs and contribute towards socio-economic development in an area that does not have high economic potential. The WEF is likely to result in significant positive socio-economic opportunities.	Vol II: Social Impact Assessment
	impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	While the proposed WEF has a generally 'high' visual impact significance, the turbines are located in locations with the highest resource wind potential. Impacts to the cultural landscape are unavoidable but only of a medium significance and no other aspects of heritage are expected to be impacted significantly.	Vol II: Social Impact Assessment; Visual Impact Assessment; Heritage Impact Assessment
	in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed development aligns with the Breede Valley Municipality Integrated Development Plan. The proposed development is predicted to support the creation of a more integrated settlement.	Vol II: Social Impact Assessment
How were a risk-averse and cautious approach applied in terms of socio-economic impacts?:	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	One limitation that could be identified is that some of the provincial documents do not contain data from the 2022 Census. The data from the 2011 and 2016 Household Community Survey is therefore referred to.	Vol II: Social Impact Assessment

"Promoting justifiable economic and social development"[40]			
	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The risk due to limits of current knowledge is considered to be low due to the positive socioeconomic impact expected from the proposed WEF.	Vol II: Social Impact Assessment
	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	A risk-averse and cautious approach was utilised throughout the impact assessment process by all specialists. The precautionary approach has been adopted for this study, i.e. assuming the worst-case scenario will occur and then identifying ways to mitigate or manage these impacts. Mitigation measures to manage these impacts have been provided.	Vol II: Social Impact Assessment
How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Negative impacts were identified by the Social Specialist. These are: • The presence of construction workers on-site and in the area on the local communities. • Potential influx of job seekers. • The potential loss of farmlands for grazing of sheep and on associated farming activities. • Potential safety risk for farmers, risk of livestock theft and theft of farming infrastructure. • The increased risk of potential grass fires associated with the construction phase. • The potential impacts of heavy vehicles and construction related activities, damage to roads, and dust pollution. • The potential loss of farmland. • Visual impact and associated impact on the sense of place. • The potential impact on tourism. • The potential loss of employment opportunities and associated income (decommissioning impact).	Vol II: Social Impact Assessment App B: EMPr EIAr Section 10

"Promoting justifiable economic and social development"[40]			
		• The establishment of several renewable energy facilities (WEFs and SEFs), may potentially place pressure on property, local services, e.g. education, medical, accommodation, water supply, waste management etc. (cumulative impact). Measures to minimise, manage and remedy negative impacts are provided in Volume II: Social Impact Assessment and Section 9 of this Report.	
	Positive impacts. What measures were taken to enhance positive impacts?	Positive impacts were identified by the Social Specialist. These are: • Establishment of renewable energy infrastructure and the generation of clean, renewable energy; • The creation of local employment and business opportunities, and opportunities for skills development and on-site training; • Benefits associated with the local economic development initiatives; and • Benefits for landowners. Details of enhancement measures are provided in the Social Impact Assessment, Section 10 of this EIAr, and are included in the EMPr.	Vol II: Social Impact Assessment EIAr Section 10
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?		It is not expected that the development's socio-economic impacts will result in significant ecological impacts. Although the development would result in some habitat loss across the site, this is not likely to affect the fauna and flora. Mitigation measures must be implemented to avoid the direct threat to the fauna. These specific mitigation measures should be implemented during construction and operation to reduce this risk. There are no impacts associated with the development of the Hugo WEF on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the Hugo WEF development is deemed acceptable from a terrestrial ecological impact perspective. In terms of cumulative impacts, the affected area has not been significantly impacted by renewable energy development to date and the contribution of the current wind farm development to cumulative impact is considered low and acceptable. It is thus the reasoned opinion of the specialist that the Hugo WEF development should be authorised subject to the various mitigation and avoidance measures as indicated.	Vol II: Terrestrial Biodiversity Assessment
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?		Iterative specialists' constraints mapping identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies, including interviews	Volume II: Specialist

"Promoting justifiable economic and social development"[40]			
		by the Social Specialist, and Scoping phase PPP, further informed the development of the updated site layout.	Assessment Reports
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?	*Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?*	The proposed development aligns with a variety of planning policies that consider environmental and spatial justice. Alternatives were 'scoped' out in the scoping phase and the most feasible environmentally and socially preferred location was chosen for approval in the EIA phase. Public consultation considers all person(s) and the application process will continue to consider all persons, and disadvantaged people who may be impacted by the development.	n/a
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?		The proposed development will contribute to equitable access by supplying electricity to the national grid, and by providing local and regional socioeconomic benefits in terms of the REIPPPP Economic Development requirements, which includes a BBBEE scorecard on which wind projects are evaluated.	n/a
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?		Construction, operation and decommissioning of the proposed development will be done according to environmental health and safety legislative requirements and applicable guidelines.	n/a
What measures were taken to:	*ensure the participation of all interested and affected parties,*	Public participation is being undertaken according to NEMA: EIA Regulations (2014) as amended and DFFE (2017) Public Participation Guidelines.	Section 9; Volume III

"Promoting justifiable economic and social development"[40]			
	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	The PPP is being undertaken in terms of legislative requirements and best practice guidelines. All notifications are provided in English and Afrikaans. Further languages are made available upon request.	Section 9; Volume III
	ensure participation by vulnerable and disadvantaged persons,	The PPP is being undertaken according to best practice guidelines and regulatory requirements; Notification of initiation of the PPP was provided in all required channels, i.e. newspaper adverts, site notices, local posters and written notifications.	Section 9; Volume III
	promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	The proposed development fits into the various planning policies and the implementation of a Community Trust will assist the local strategies, including improving education facilities and youth development	Vol II: Social Impact Assessment
	ensure openness and transparency, and access to information in terms of the process,	Legislative requirements and best practice guidelines are followed throughout the process. The PPP is being undertaken in terms of legislative requirements and best practice guidelines.	Section 9; Volume III
	ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and	A PPP is being undertaken in terms of legislative requirements and best practice guidelines. A Social Impact Assessment forms part of the Scoping & EIA process. The independent Social Specialist ensures that all needs and values are considered.	Section 9; Volume III: Social Impact Assessment

"Promoting justifiable economic and social development"[40]			
	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?	The Social Impact Assessment and PPP that are conducted according to legislation and guidelines ensure that women and youth are recognised and involved in the process. REIPPPP requirements place specific responsibilities on IPPs in terms of women and youth development.	Section 9; Volume III: Social Impact Assessment
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?		The proposed WEF has a good planning fit with all applicable policies and will result in substantial local socio-economic opportunities. The key challenges facing the region are poverty and inequality and a shortage of skills. As such the proposed development will be of benefit to the local area by creating job and business opportunities, particularly for unskilled and semi-skilled local workers.	Volume II: Social Impact Assessment
What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?		Future workers on the proposed development will be educated on their rights to refuse work.	n/a
Describe how the development will impact on job creation in terms of, amongst other aspects:	*the number of temporary versus permanent jobs that will be created,*	An estimated 200-250 temporary employment opportunities will be created for 18 - 24 months during the construction phase. Approximately 20 full time employment opportunities will be created for the operational phase of the proposed development.	Volume II: Social Impact Assessment
	whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the	Members from the local communities in De Doorns and Touws River would qualify for a percentage of low skilled and semi-skilled employment opportunities and several skilled opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels	Volume II: Social Impact Assessment

"Promoting justifiable economic and social development"[40]			
	skills available in the area),	and limited job opportunities in the area, this will represent a significant, if localised, social benefit.	
	the distance from where labourers will have to travel,	It is expected that most workers will reside in the nearby towns Worcester, De Doorns and Touws River	Volume II: Social Impact Assessment
	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	Members from the local communities in De Doorns and Touws River would qualify for some of the low skilled and semi-skilled employment opportunities and several skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a social benefit. It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. A percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy. This will benefit local businesses in the relevant towns. The benefits to the local economy will extend over the anticipated 20-year operational lifespan of the project. The local hospitality industry is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations. Procurement during the operational phase will also create opportunities for the local economy and businesses.	Volume II: Social Impact Assessment
	the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	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 De Doorns and Touws River. Majority of households depend of the agriculture sector, therefore this proposed employment will create employment opportunities.	Volume II: Social Impact Assessment
What measures were taken to ensure:	*that there were intergovernmental coordination and*	All applicable planning policies and legislation were considered. The proposed development fits with all planning policies.	Volume I: EIA Report

"Promoting justifiable economic and social development"[40]			
	harmonisation of policies, legislation and actions relating to the environment, and	Organs of State were pre-identified and registered on the I&AP database and these were updated, if required, as the development phases have progressed.	Volume III: PP Report
	that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	As registered I&APs all public correspondence including notifications of reports availability are provided.	Volume III: PP Report
What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?		The proposed development aims to uphold the principles of sustainable development. The project team consists of suitably qualified individuals that comply with all legal requirements.	Volume I: EIA Report Volume II: Specialist Reports
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?		Specialist mitigation measures were identified during the EIA process and provided in the EIAr and EMPr. These measures are realistic and should they change, the EMPr must be submitted to the Department and made available for public to review and comment.	Volume I: Appendix B: EMPr
What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?		An EMPr is submitted with EIAr. The EMPr is a legally binding document, which when enforced during construction, operational or decommissioning phases, hold the applicant or their representative liable for any remedial actions as a result of negligence.	Volume I: Appendix B: EMPr

"Promoting justifiable economic and social development"[40]		
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	The alternative selection process includes the assessment of the No Development alternative, site alternatives, design layout alternatives and technology alternatives.	Section 7
Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Cumulative impact on sense of place The proposed Hugo WEF is also one half of a larger wind energy cluster consisting of another proposed WEF to the south, namely the Khoe WEF. The cumulative visual impact of the proposed Hugo WEF, together with the proposed Khoe WEF is expected to be Very High, depending on the observer's sensitivity to wind turbine structures. The VIA notes that owing to the sensitivity of the landscape, the high visual quality and the potential visual impacts on sensitive visual receptors, the cumulative visual impact is not considered to be within acceptable limits. Cumulative impact on local services and accommodation The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF, in the Breede Valley Municipality and Langeberg Municipality has the potential to place pressure on local services, specifically medical, education and accommodation. Cumulative impact on local economy The establishment of renewable energy facilities and associated projects, such as the WEF, in the BVM will create employment, skills development and training opportunities, creation of downstream business opportunities.	Volume II: Social Impact Assessment

5.1 THE NEED AND DESIRABILITY OF RENEWABLE ENERGY FACILITIES

Renewable Energy Facilities play a role in mitigating or reducing climate change, addressing South Africa's energy resource constraints, and producing low-cost energy. In addition, operating these facilities 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 and policy supports the development of renewable energy to address energy supply issues, and to promote economic growth in South Africa.

5.1.1 CLIMATE CHANGE, DIVERSIFICATION AND DECENTRALISATION OF SUPPLY

The scientific consensus is that climate is changing and that these changes are in large part caused by human activities. Of these human activities, increase in carbon dioxide (CO_2) levels due to emissions from fossil fuel combustion is regarded as a significant contributor to anthropogenic climate change. South Africa is one of the world's largest emitters of CO_2 in absolute and per capita terms.

The National Climate Change Adaptation Strategy (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 the changing climate conditions and the affect it has on various sectors. An action in support of this proposed 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".

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.

According to the Department of Energy's (DoE) total energy supply data of 2018, the primary source of energy in South Africa is coal, which provides approximately 65% of South Africa's energy, followed by crude oil with 18% and renewables with 11%. Natural gas contributes 3% while nuclear energy contributes approximately 2%. Electricity generation is dominated by the state-owned power company Eskom, which currently produces over 95% of the power used in the country.

If the National Development Plan (NDP) future hope is met, by 2030 South Africa will have an energy sector that promotes economic growth and development through adequate investment in energy infrastructure. The DoE Integrated Resource Plan (IRP) for Electricity 2019, was promulgated in October 2019 and replaced the IRP 2010 as the country's official electricity infrastructure plan. It calls for 37 696 MW of new and committed capacity to be added between 2019 and 2030 from a diverse mix of energy sources and technologies as ageing coal plants are decommissioned and the country transitions to a larger share of renewable energy. By 2030, the electricity generation mix is set to comprise of 33,364 MW (42.6%) coal, 17,742 MW (22.7%) wind, 8 288 MW (10.6%) solar photovoltaic (PV), 6 830 MW (8.7%) gas or diesel, 5,000 MW (6.4%) energy storage, 4,600 MW (5.9%) hydro, 1,860 MW (2.4%) nuclear and

600 MW (0.8%) concentrating solar power (CSP). Additionally, a short-term gap at least 2000 MW is to be filled between 2019 and 2022, thereby further raising new capacity requirements, while distributed or embedded generation for own-use is positioned to add 4000 MW between 2023 and 2030. The IRP is intended to be frequently updated, which could impact future capacity allocations from various energy sources and technologies.

The NDP also includes that South Africa will have an adequate supply of electricity and liquid fuels to ensure that economic activities and welfare are not disrupted, and that at least 95% of the population will have access to grid or off-grid electricity.

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. 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."

5.1.2 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 5-3 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.

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 to have a competitive project. Broad-based community trusts are established as a vehicle for Local Community Ownership to received 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, several 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.

5.2 POLICIES IN SUPPORT OF RENEWABLE ENERGY

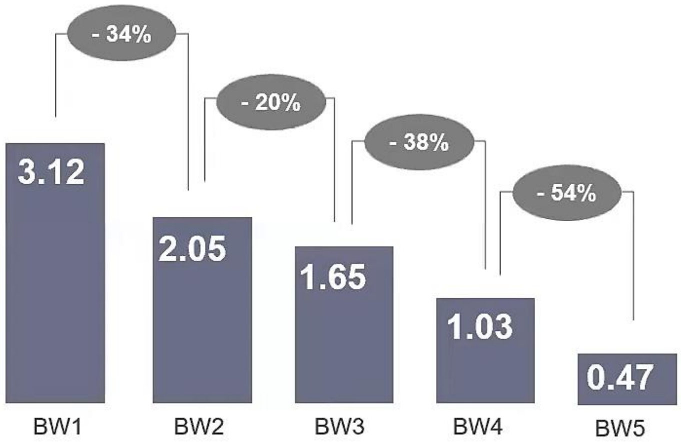
Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of and investment in renewable energy is supported by the NDP, New Growth Path Framework, IRP, and the National Infrastructure Plan.

At a provincial level, the development of renewable energy is supported by the Western Cape Provincial Spatial Development Framework (2014), Western Cape Climate Change Response Strategy, Langeberg Integrated Development Plan (IDP) for 2022-2027 and Spatial Development Framework.

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 need it.

Aside from environmental considerations, investment in renewables have been driven by dramatic reductions in their costs. Figure 5-1 shows this trend and that in the six years between BW 4 and 5, the average price of electricity purchased through the REIPPPP fell by 54% (Magoro, 2021).

FIGURE 5-1 REIPPP AVERAGE BID PRICES IN APRIL 2021 TERMS (MAGARO, 2021)



6. DESCRIPTION OF THE BASELINE ENVIRONMENT

To evaluate the potential environmental 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, data is 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.

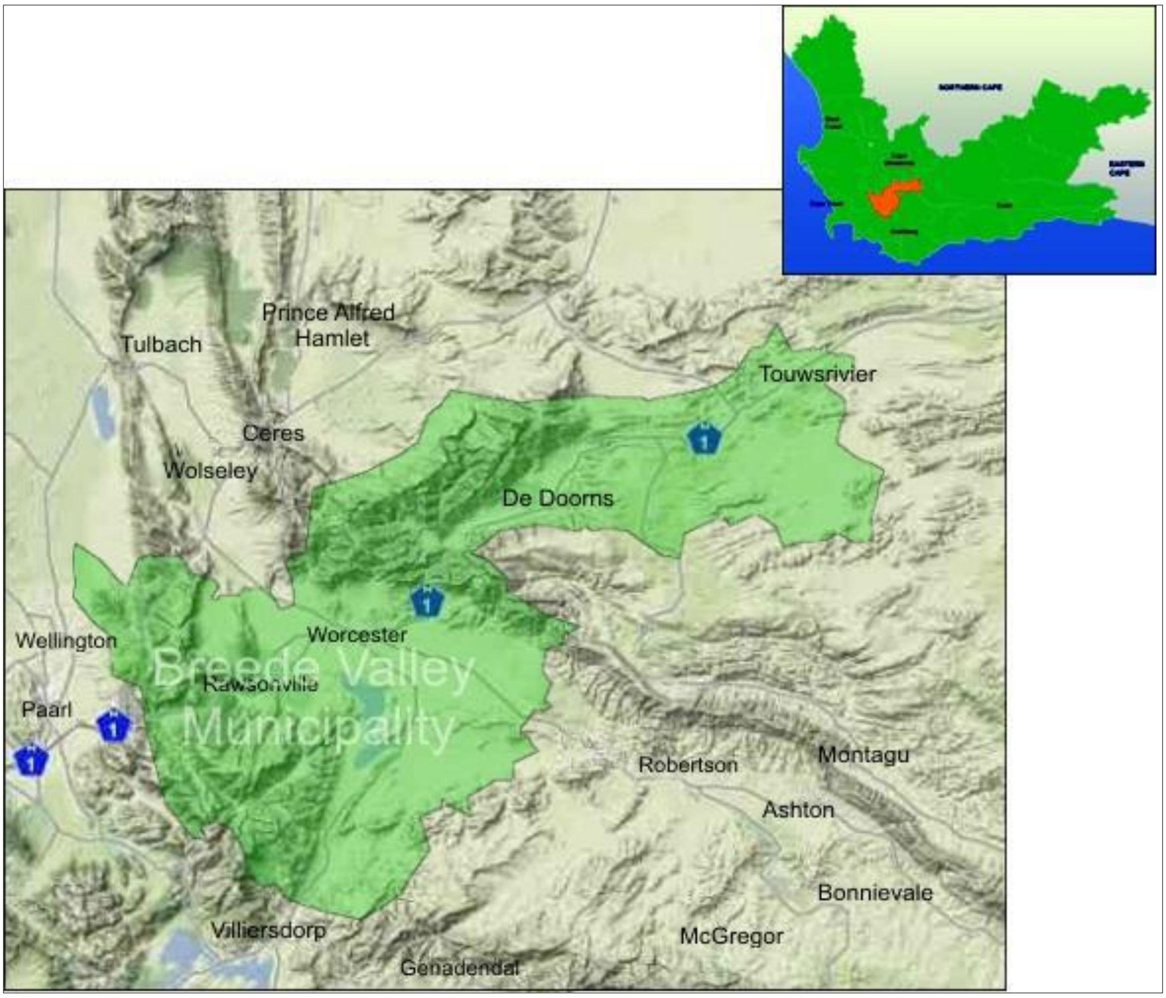
6.1 REGIONAL AND LOCAL CONTEXT

The study area is located within the Breede Valley Municipality (BVM) within the Western Cape Province (Figure 6-1). The BVM is one of five Local Municipalities that make up the Cape Winelands District Municipality.

The site straddles the R 318 which is a designated tourist route in terms of the Langeberg Spatial Development Framework (SDF) (2023). An initial review of available information indicates that there are several provincial and private nature reserves and tourist facilities located in the area. The proposed Hugo WEF is therefore located in an area that is visually sensitive.

The 2021 Socio-Economic Profile for the Breede Valley (BVM) prepared by the Western Cape Department of Social Development, indicates that the population of the BVM in 2021 was 194,555 making it the second most populated municipality in the Winelands district Municipality. The population is projected to be 200,911 by 2025 which equates to a 0.8 % annual average growth rate. Based on the 2022 Census data the population of the BVM was 212,682. The total number of households was 54,284, with an average household size of 3.9, the same as 2011.

FIGURE 6-1 LOCATION OF BREEDE VALLY MUNICIPALITY WITHIN THE WESTERN CAPE PROVINCE



6.2 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA

6.2.1 TOPOGRAPHY AND TERRAIN

The study area occurs on land that ranges in elevation from approximately 200 metres above sea level (m asl) in the south west at the base of the Langberg Mountain along drainage lines and in the west along the Hex River to 1,800m asl on the tops of mountain ranges such as Kwadousberg and Langberg. The site itself is located on land with an average elevation of 1,500m asl. Numerous mountain ranges are located within the study area, namely the Hexrivierberge and Kwadousberg in the west, Langberg 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.

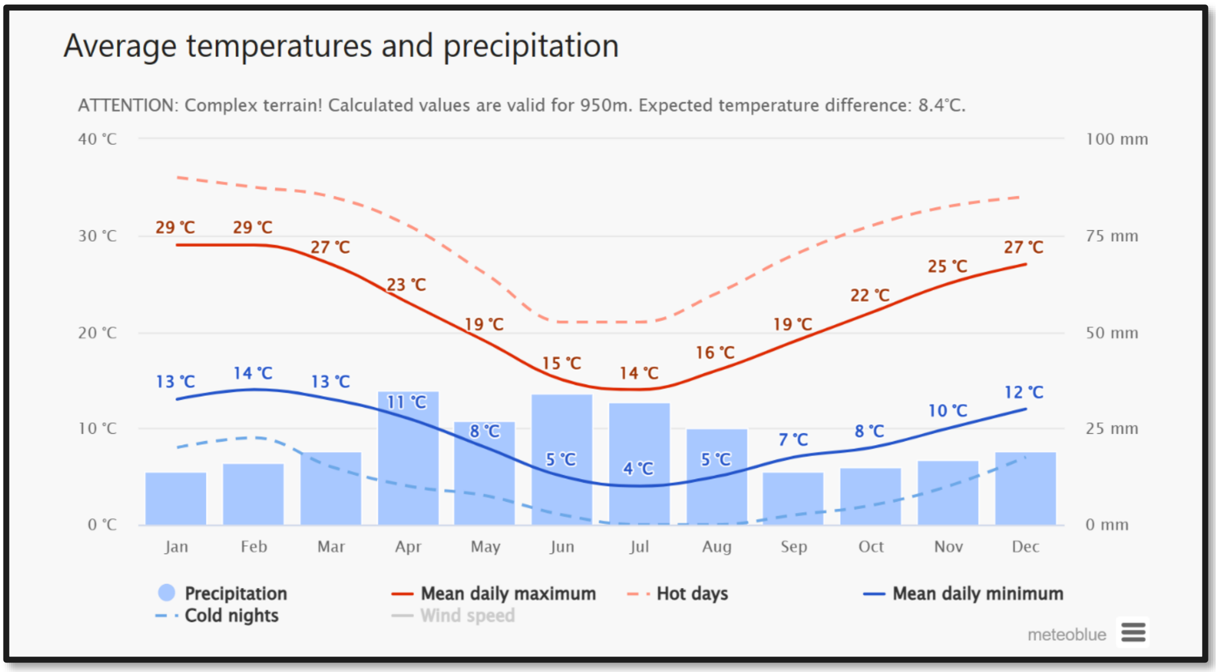
6.2.2 CLIMATE CONDITIONS

The proposed Hugo WEF is situated on a plateau, which is occasionally called the “Agterveld”. Most of the precipitation occurs in winter with a second 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 Hugo 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 6-2 below). There is a difference of approximately 21 mm between the wettest and driest months (meteoblue.com, 2023).

The average maximum temperature is 29ºC and the average minimum temperature 4ºC, while the highest maximum recorded temperature is 36ºC, and the lowest minimum is 0ºC. 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 6-2 CLIMATE OF THE MATROOSBERG WEATHER STATION (METEOBLUE.COM, 2023)



6.2.3 GEOLOGY

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, light 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. Cropping potential is limited by a combination of climate and soil constraints. 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 Hugo WEF site are predominantly 2 (low-very low), and 5 (moderate). The agricultural land use in the surrounding area, as well as the site is dry land crop production, as well as grazing.

6.2.4 FRESHWATER AND WETLANDS (AQUATICS)

The study area is dominated by three types of natural aquatic features and a small number of artificial barriers associated with catchments and rivers, characterised as follows:

- High lying seepage wetland areas, with little to no channels;
- Low lying alluvial watercourses and alluvial floodplain areas;
- Watercourses, some with riverine wetland areas dominated by sedges;
- Small depression; and
- Dams and weirs / berms with no wetland or aquatic features.

The site is situated within the North Langeberg Sandstone Fynbos, Matjiesfontein Shale Renosterveld and Matjiesfontein Quartzite Fynbos) vegetation units, all forming part of the Donkies, Hex & Die Brak river catchments. These vegetation units are not listed as a Threatened Ecosystem by NEMA due to it being considered Endangered, but a portion of the site does fall within a portion of the Matroosberg Mountain Catchment Protected Area. Notably the study area is also considered part of a Strategic Water Resource Area (Tulbagh-Aston Valley Groundwater & Boland Surface Water systems), but not located within a National Protected Area Expansion Strategy conservation site.

The study area is bisected by the Western and Southern Folded Mountain Bioregions, 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 Present Ecological State (PES) of a river, watercourse or wetland represents the extent to which it has changed from near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The PES scores have been revised for the country and based on the new models, aspects of functional importance as well as direct and indirect impacts have been included (DWS, 2014). The new PES system incorporates Ecological Importance (EI) and Ecological Sensitivity (ES) separately as opposed to Ecological Importance and Sensitivity (EIS) in the old model, although the new model is still heavily centred on rating rivers using broad fish, invertebrate, riparian vegetation and water quality indicators. The Recommended Ecological Category (REC) is still contained within the new models, with the default REC being B, when little or no information is available to assess the system or when only one of the above-mentioned parameters are assessed or the overall PES is rated between a C or D.

All the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES = D or Largely Modified. While these were also rated as High in terms of Ecological Sensitivity and Very High in terms of Ecological Importance respectively.

Based on the information collected during the field investigations, these ratings were verified and upheld for the riverine systems, while some of the systems were rated high (PES = B or C) as they were in a better condition. The high ecological sensitivity rating for the natural water sources was further substantiated by the fact that the affected catchments are considered Critical Biodiversity Areas, Ecological Support Areas, wetlands and rivers. Further, the sites are shown as National Freshwater Ecosystem Priority Area (NFEPA) and Mountain Catchment Areas (Matroosberg).

Overall, these catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with road crossings;
- Grazing and farming;
- Alien invasive trees/plants; and
- Impeded water flow due to several in channel farm dams.

The ground-truth delineations were compared to current waterbody inventories. 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. Little was known or assessed previously for this site. The delineated wetlands, watercourse and depressions in relation to the site layout is shown in Figure 6-3.

FIGURE 6-3 PROPOSED LAYOUT MAY 2024 IN RELATION TO DELINEATED WETLANDS, WATERCOURSES AND IN PLACES DEPRESSIONS

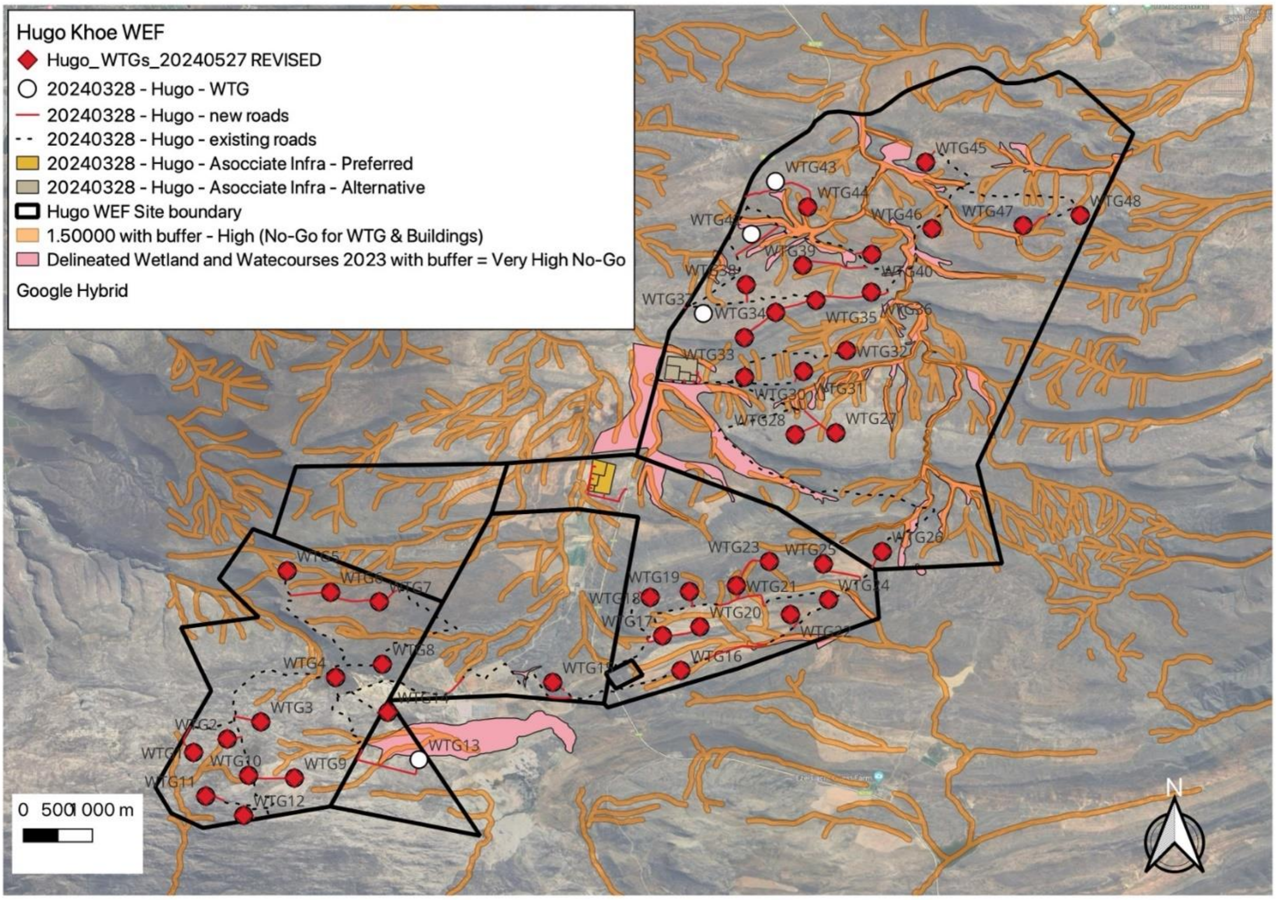
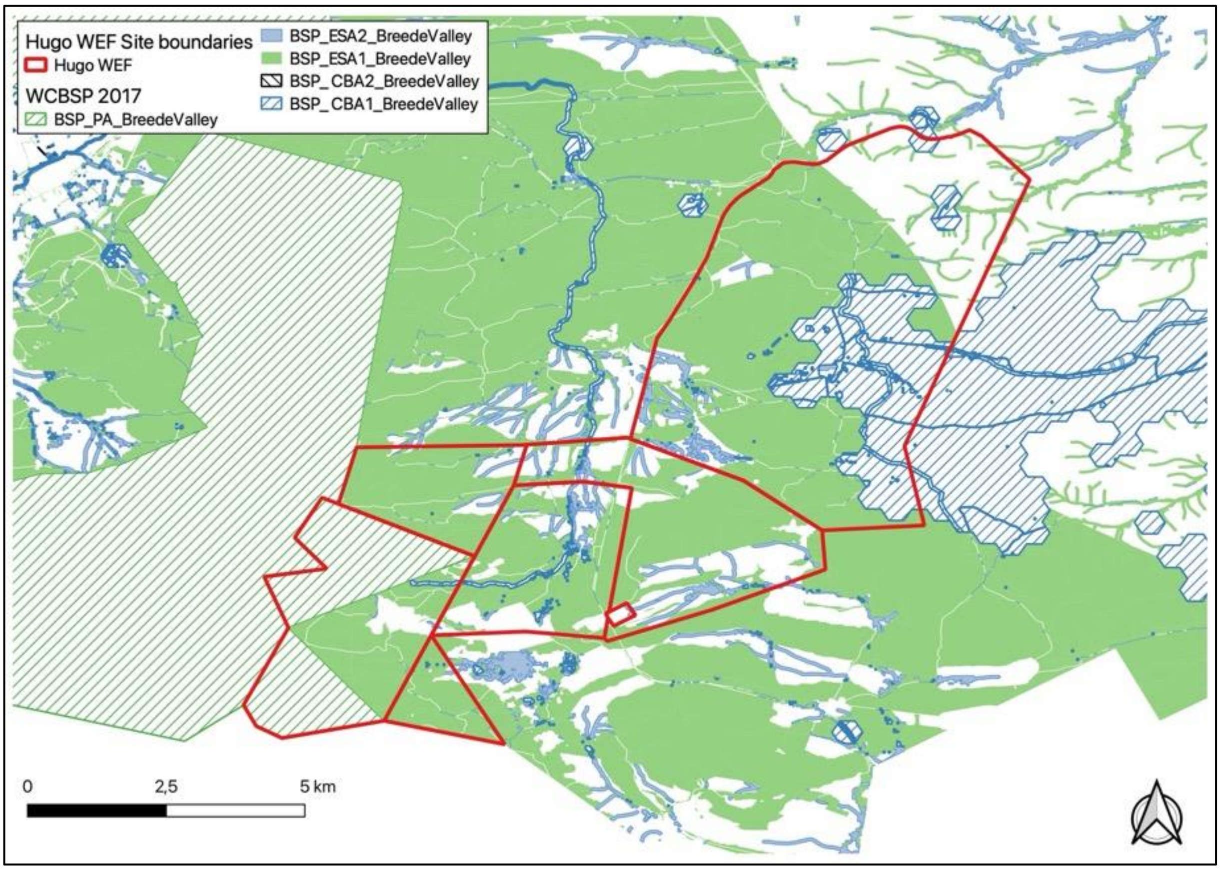


FIGURE 6-4 THE CRITICAL BIODIVERSITY AREAS AS PER THE WESTERN CAPE BIODIVERSITY SPATIAL PLAN – WCBSP 2017



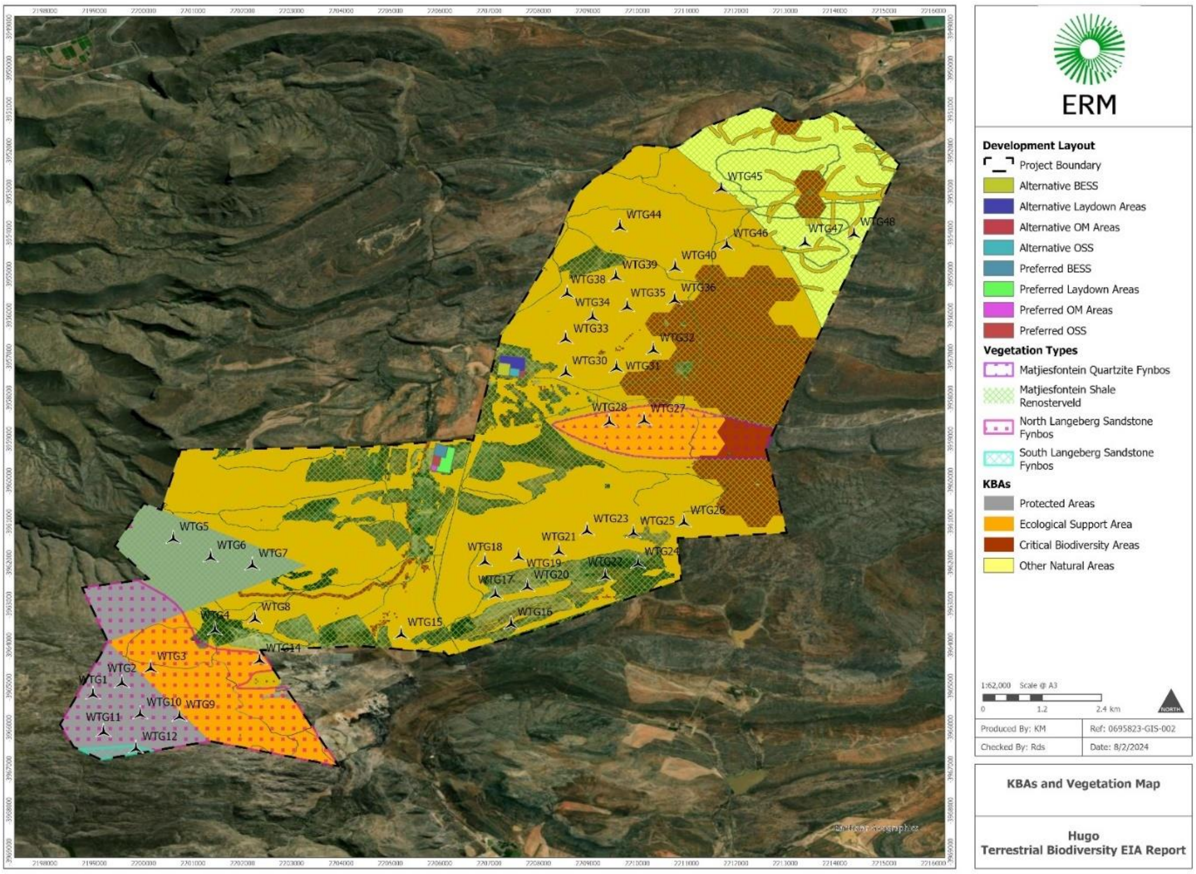
The sensitivity ratings of High (No-Go) to Low were determined through an assessment of the habitat sensitivity and related constraints. However, these No-Go areas (with buffers) relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e. existing road crossings within systems) and this is considered acceptable since these areas are already disturbed.

These proposed constraints / buffers do not include bird buffers / constraints as theirs buffers along aquatic features are at times far larger around aquatic features, than those required for the known aquatic species within this region.

6.2.5 HABITAT/VEGETATION TYPES

The proposed Hugo WEF PAOI is dominated by Matjiesfontein Shale Renosterveld, followed by a section of North Langeberg Sandstone Fynbos and a small section of South Langeberg Sandstone Fynbos in the western sections, and Matjiesfontein Quartzite Fynbos in the south-eastern section of the proposed PAOI (Figure 6-5). All three of the vegetation types identified are listed as Least Concern by the RLE (2022).

FIGURE 6-5 IMPORTANT VEGETATION AND KEY BIODIVERSITY AREAS WITHIN THE PROPOSED HUGO WIND ENERGY FACILITY STUDY AREA



The landscape of the Matjiesfontein Shale Renosterveld is described as being elevated areas (low mountains, parallel hills and mid-altitude plateaus) of low, moderate density leptophyllous shrubland dominated by renosterbos (*Dicerothmanus rhinocerotis*). Heuweltjies, which are soil mounds associated with increased local biodiversity, have been recorded in low densities in some places[41]. The North and South Langeberg Sandstone Fynbos are similar in their constituent vegetation types of proteoid, restioid and ericaceous fynbos, differing only by occurrence altitude and also including asteraceous fynbos on lower slopes. The Matjiesfontein Quartzite Fynbos consists of narrow, linear bands of moderate density, medium tall shrublands of asteraceous and proteoid shrubland.

Western sections of the proposed PAOI fall within the Matroosberg Mountain Catchment Area, which is a Protected Area (PA) and currently includes Wind Turbine Generators (WTG) 1, 2, 9, 10, 11 and 12 (Figure 6-5). This area expands into the NPAES and are areas which through contractual agreement, land acquisition and declaration of state-owned land, aim to increase the area of PA to improve ecosystem representation, ecological sustainability and resilience to climate change.

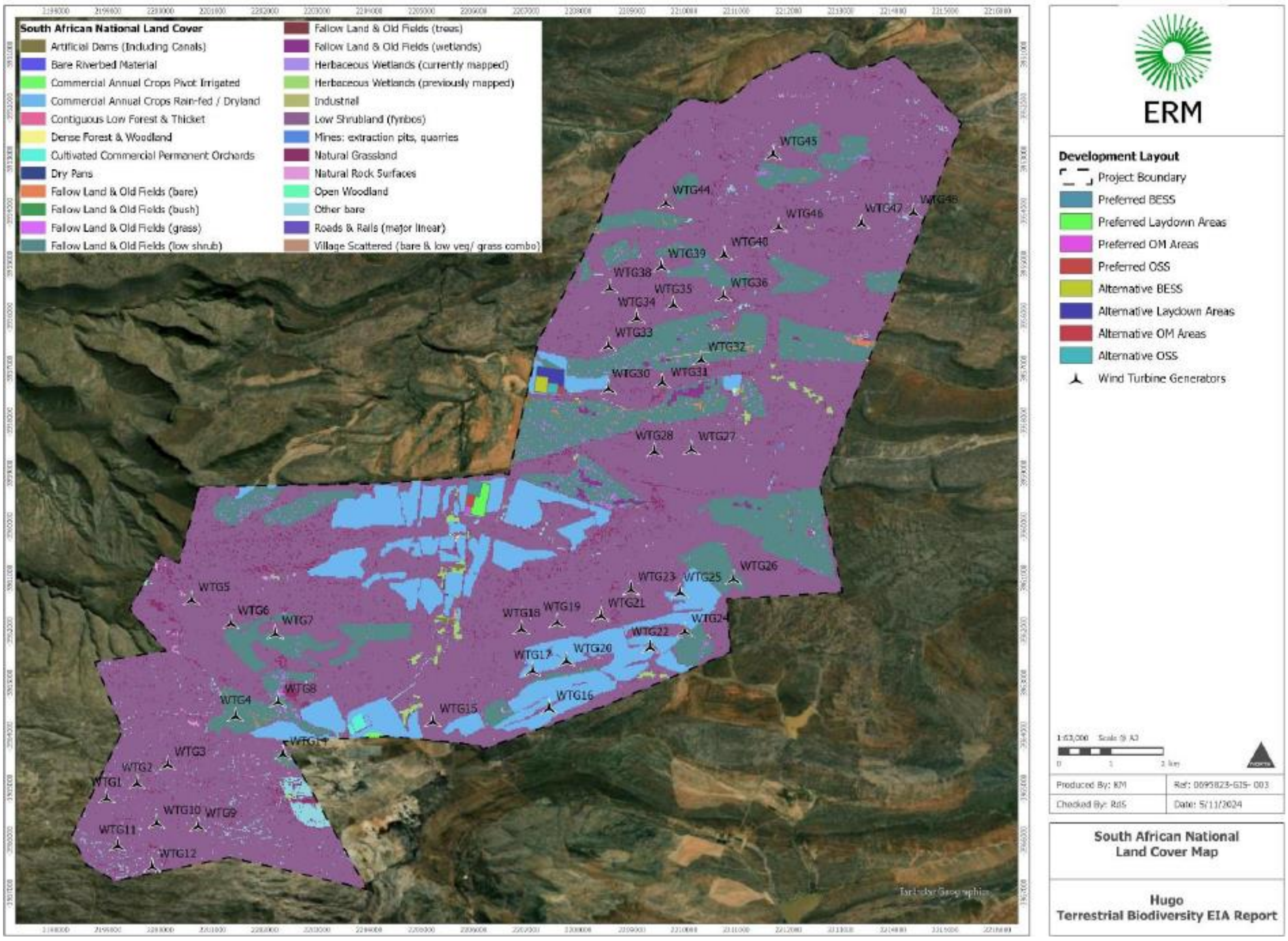
[41]Mucina, L. & Rutherford, M.C. (2006). The vegetation of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute.

Most of the site falls within an ESA, which is classified as such due to the presence of predicted climate corridors, aquatic features that maintain broader ecological balance and processes that are essential in supporting biodiversity conservation. This area currently includes most WTGs. The ESAs must be maintained in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functions are not compromised.

Eastern sections of the proposed PAOI fall within a CBA, classified as such due to the presence of various aquatic features that contribute to high levels of biodiversity in this specific area, and currently includes no WTGs. CBAs must be maintained in a natural, or near-natural state with no further loss of natural habitat. Degraded areas in the CBA should be rehabilitated, and only low-impact land uses are considered appropriate.

The north-eastern section of the proposed PAOI falls within Other Natural Areas (ONAs), which are not currently identified as priority but retain most of their natural character and perform a range of biodiversity and ecological infrastructure functions. This area currently includes WTGs 45, 47 and 48. According to the SANLC (2020) spatial dataset the proposed Hugo WEF PAOI (Figure 6-6) is dominated by low fynbos shrublands, followed by bare fallow lands, bare old fields, and commercial annual crops (rain-fed, dryland or non-irrigated). The site inspection confirmed that large portions of the proposed project site have been modified and/or disturbed through agricultural activity. Strips of natural vegetation that remain, particularly those around drainage lines, perennial rivers and farm dams, appear to be overgrazed.

FIGURE 6-6 THE LATEST AVAILABLE SOUTH AFRICAN NATIONAL LAND COVER DATASET OF THE PROPOSED HUGO WIND ENERGY FACILITY



Additional land use types present include small areas of dense forest and woodland (35 - 75% closed canopy/CC – likely alien species), open woodland (10 - 35% CC), natural grassland, bare, artificial dams including canals, herbaceous wetlands (previous mapped extent), cultivated commercial permanent orchards, commercial annuals (pivot irrigated), major linear roads and rail and fallow lands and old fields (grasslands, low vegetation and wetlands).

Ten surveys were conducted in the dominant Matjiesfontein Shale Renosterveld. These surveys include three Drainage Area habitats, three Low Shrubland habitats, three Riparian habitats and a single Rocky Outcrop. One of the Low Shrubland habitats survey is found on the periphery between the PA associated with the Matroosberg Mountain Catchment Area and the North Langeberg Sandstone Fynbos toward the southwest of the PAOI and can be considered transitional between Low Shrubland and a northeast-facing Rocky Outcrop. One survey was also conducted within the eastern CBA of the proposed PAOI. A single survey was conducted in the low shrublands associated with north-facing slopes of the Matjiesfontein Quartzite Fynbos. No surveys were conducted directly within the PA and associated North and South Langeberg Sandstone Fynbos habitats due to inaccessibility to these vegetation types.

The identified habitats are described below.

6.2.5.1 MATJIESFONTEIN QUARTZITE FYNBOS LOW SHRUBLAND

The surveys for the Matjiesfontein Quartzite Fynbos Low Shrubland were conducted on a gradual north-facing slope, with sections featuring slight rocky outcrops. Dominant flora species observed include *Dicerothamnus rhinocerotis* (Renosterbos), *Tenaxia stricta*, and *Aizoon africanum*. Common plant species found in the area included *Oedera squarrosa, Ruschia multiflora*, and *Struthiola eckloniana*. Despite the habitat's varied topography and flora composition, findings from three surveys indicated a relatively low diversity of plant species, with only 24 species documented in total. Consequently, the calculated Site Ecological Importance is rated as medium, highlighting the habitat's ecological significance within the Matjiesfontein region.

6.2.5.2 MATJIESFONTEIN SHALE RENOSTERVELD LOW SHRUBLAND

The Matjiesfontein Shale Renosterveld Low Shrubland habitat encompasses undulating hills intersected by drainage lines, characterized by clay-like soils and minimal rockiness. The landscape is predominantly populated by shrubs, with Dicerothamnus rhinocerotis (Renosterbos) and Aizoon africanum being the most prevalent species. Additionally, Euryops lateriflorus was observed on the site, albeit less abundantly. Despite the habitat's dominance by shrubs, species diversity was relatively low, with only 21 documented species. Notably, powerlines were prevalent throughout the survey area, potentially influencing the habitat's ecological dynamics and biodiversity.

6.2.5.3 MATJIESFONTEIN SHALE RENOSTERVELD DRAINAGE AREA

The Matjiesfontein Shale Renosterveld drainage area habitat was characterized by a primary drainage line, featuring minimal exposed soil and rockiness. Shrubs were prevalent, covering up to 80% of the landscape. A total of 34 flora species were identified on-site, with dominant species including *Aizoon africanum*, *Chamarea* sp., *Pteronia incana*, and renosterbos. Additionally, within the flood zone, *Nidorella ivifolia* emerged as a dominant species.

6.2.5.4 MATJIESFONTEIN SHALE RENOSTERVELD RIPARIAN HABITAT

The Matjiesfontein Shale Renosterveld Riparian habitat presents a distinctive landscape characterized by water body depressions, rockiness ranging from minimal too high in some areas, and up to 80% exposed soil. Shrubs, mainly Aizoon africanum and Dicerothamnus rhinocerotis (renosterbos), are abundant and dominant in this habitat. Findings from three field surveys revealed a relatively medium diversity of plant species, with roughly 50 species recorded in total. Despite this, the habitat maintains some ecological significance, with the calculated Site Ecological Importance rated as medium. Additionally, the habitat is disturbed, with a high level of rockiness estimated to cover 70-80% of the area in varying sections. Pioneer species such as Gomphocarpus fruticosus are prevalent in disturbed areas, alongside natural renosterbos, contributing to the ecosystem's complexity. Despite these challenges, the total record of flora and type of species recorded on site indicates the habitat's resilience.

6.2.5.5 MATJIESFONTEIN SHALE RENOSTERVELD ROCKY OUTCROPS

The rocky ridge surveyed for this habitat was characterized by a deep depression and east-facing slope. As expected, the area’s percentage of rockiness was 90% in some areas and 100% in others. Pteronia paniculata was a dominant flora species documented on site, while renosterbos was occasionally reported within this specific habitat. Pteronia paniculata is known to occur in rocky and dry habitats, acting as a canopy for low-growing succulents on rocky substrate. This specific species is a pioneer species and is found to establish itself in over-grazed, disturbed areas.

6.2.6 FLORA

A total of 1,777 plant species potentially occur in and/or within proximity of the proposed Hugo WEF. The DFFE Online ST identified seven EN, 15 VU, and 15 Rare plant species according to Regional Red Lists potentially present within the proposed study area (Table 6-1).The sources include the SANBI POSA Brahms (B) database, the Global Biodiversity Information Facility (GBIF) database, The DFFE Online ST and the Biodiversity and Development Institute's Virtual Museum (VM) database.

TABLE 6-1 PLANT SPECIES OF CONSERVATION CONCERN TRIGGERED BY THE DFFE ONLINE SCREENING TOOL

Family	**Species**	**Red List Status (Regional:Global)**	**Source**
Aizoaceae	*Drosanthemum giffenii*	VU:NE	GBIF, ST
Aizoaceae	*Drosanthemum tuberculiferum*	EN:NE	GBIF, ST
Aizoaceae	*Drosanthemum worcesterense*	EN:NE	ST
Aizoaceae	*Esterhuysenia inclaudens*	Rare:NE	ST
Aizoaceae	*Octopoma nanum*	VU:NE	ST
Aizoaceae	*Phiambolia littlewoodii*	VU:NE	ST
Asparagaceae	*Asparagus mollis*	VU:NE	ST
Asteraceae	*Anderbergia elsiae*	Rare:NE	ST
Asteraceae	*Athanasia hirsuta*	Rare:NE	B, GBIF, ST
Asteraceae	*Eriocephalus microphyllus* var. *carnosus*	EN:NE	ST
Asteraceae	*Metalasia helmei*	Rare:NE	B, GBIF, ST
Brassicaceae	*Heliophila elata*	VU:NE	ST
Ericaceae	*Erica constantia*	Rare:NE	ST
Fabaceae	*Amphithalea dahlgrenii*	VU:NE	ST
Fabaceae	*Amphithalea pageae*	VU:VU	GBIF, ST
Fabaceae	*Amphithalea spinosa*	VU:NE	B, GBIF, ST
Fabaceae	*Aspalathus intricata* subsp. *oxyclada*	Rare:NE	ST
Fabaceae	*Aspalathus rostrata*	Rare:NE	B, GBIF, ST

Family	Species	Red List Status (Regional:Global)	Source
Fabaceae	*Aspalathus shawii* subsp. *longispica*	Rare:NE	GBIF, ST
Fabaceae	*Lotononis argentea*	VU:NE	GBIF, ST
Fabaceae	*Lotononis gracilifolia*	EN:NE	GBIF, ST
Fabaceae	*Otholobium* sp. nov (Storton & Zanotvska 11281 NBG)	VU:NE	ST
Iridaceae	*Ixia fucata*	Rare:NE	GBIF, ST
Iridaceae	*Ixia oxalidiflora*	VU:NE	B, GBIF, ST
Orchidaceae	*Pachites bodkinii*	Rare:NE	ST
Proteaceae	*Leucadendron cordatum*	Rare:LC	B, GBIF, ST
Proteaceae	*Protea holosericea*	EN:CR	ST
Proteaceae	*Protea rupicola*	EN:EN	ST
Rhamnaceae	*Phylica comptonii*	Rare:NE	ST
Rutaceae	*Acmadenia matroosbergensis*	Rare:NE	B, GBIF, ST
Withheld	Sensitive Species 1209	Rare:NE	ST
Withheld	Sensitive Species 142	VU:NE	ST
Withheld	Sensitive Species 207	Rare:NE	B, ST
Withheld	Sensitive Species 654	VU:NE	ST
Withheld	Sensitive Species 692	VU:NE	ST
Withheld	Sensitive Species 871	VU:NE	B, ST
Withheld	Sensitive Species 521	EN:NE	GBIF, ST

6.2.7 FAUNA

A total of 586 animal species have been identified as potentially present on site. These include 259 invertebrates, 222 bird, 49 reptile, 46 mammal, and 10 amphibian species. Of these species, 30 are regional SCC, and 29 are international SCC (Table 6-2). Online database records include the Black Browed Albatross (*Thalassarche melanophris*), which is a strictly marine species, several large mammal species with natural distribution ranges that do not intersect with the POAI (African Bush Elephant – *Loxodonta Africana*, Hippopotamus – *Hippopotamus amphibius*, Mountain Reedbuck – *Redunca fulvorufula*, and Plains Zebra – *Equus quagga*), and the African Lion (*Panthera leo*), which is listed as extinct within a historic distribution range which intersects with the PAOI. These records likely represent chance encounters and/or translocated individuals on private game farms.

TABLE 6-2 ANIMAL SPECIES OF CONSERVATION CONCERN POTENTIALLY PRESENT IN THE HUGO WEF PAOI

Family	Scientific Name	Red List Status (Regional:International)	Group	Source
Accipitridae	*Aquila verreauxii*	VU:LC	Aves	GBIF, ST
Accipitridae	*Buteo trizonatus*	LC:NT	Aves	GBIF
Accipitridae	*Circus maurus*	EN:EN	Aves	GBIF, ST, VM
Accipitridae	*Circus ranivorus*	EN:LC	Aves	GBIF
Accipitridae	*Polemaetus bellicosus*	EN:EN	Aves	GBIF
Anatidae	*Oxyura maccoa*	NT:EN	Aves	GBIF
Chaetopidae	*Chaetops frenatus*	NT:NT	Aves	GBIF, VM
Ciconiidae	*Ciconia nigra*	VU:LC	Aves	GBIF, VM
Fringillidae	*Crithagra leucoptera*	NT:NT	Aves	GBIF
Gruidae	*Anthropoides paradiseus*	NT:VU	Aves	GBIF
Heliornithidae	*Podica senegalensis*	VU:LC	Aves	GBIF
Muscicapidae	*Monticola explorator*	LC:NT	Aves	GBIF
Otididae	*Eupodotis afra*	VU:LC	Aves	GBIF, ST, VM
Otididae	*Neotis ludwigii*	EN:EN	Aves	VM
Phoenicopteridae	*Phoenicopterus minor*	NT:NT	Aves	VM
Picidae	*Geocolaptes olivaceus*	LC:NT	Aves	GBIF
Procellariidae	*Procellaria aequinoctialis*	VU:VU	Aves	GBIF
Sagittariidae	*Sagittarius serpentarius*	VU:EN	Aves	GBIF
Scolopacidae	*Calidris ferruginea*	LC:NT	Aves	GBIF
Scolopacidae	*Calidris minuta*	LC:NT	Aves	GBIF
Turnicidae	*Turnix hottentottus*	EN:LC	Aves	GBIF
Lycaenidae	*Aloeides caledoni*	Rare:LC	Invertebrates	ST
Lycaenidae	*Chrysoritis irene*	Rare:LC	Invertebrates	VM
Lycaenidae	*Chrysoritis rileyi*	EN:EN	Invertebrates	GBIF
Lycaenidae	*Lepidochrysops bacchus*	Rare:LC	Invertebrates	VM
Synlestidae	*Ecchlorolestes peringueyi*	NT:NT	Invertebrates	VM
Bovidae	*Damaliscus pygargus subsp. pygargus*	VU:NE	Mammalia	VM
Bovidae	*Pelea capreolus*	NT:NT	Mammalia	GBIF, VM
Bovidae	*Syncerus caffer*	LC:NT	Mammalia	VM

Family	Scientific Name	Red List Status (Regional:International)	Group	Source
Felidae	*Panthera pardus*	VU:VU	Mammalia	GBIF, VM
Leporidae	*Bunolagus monticularis*	CR:CR	Mammalia	ST
Mustelidae	*Aonyx capensis*	NT:NT	Mammalia	VM
Testudinidae	*Psammobates tentorius subsp.*	NT:NT	Reptilia	VM
Testudinidae	*Psammobates tentorius subsp. tentorius*	NT:NT	Reptilia	VM

A total of 3,873 images of 4,513 animals were recorded by camera traps during the study. These represented 66 positively identified species. The most frequently recorded species across the study were sheep (Ovis aries), accounting for 1,232 of images. Cape Spurfowl (Pternistis capensis, 13%), hare sp. (Lepus sp. 9%), Black-backed Jackal (Canis mesomelas, 8.5%) and African Wildcat (Felis lybica, 4.6%) were also frequently recorded. However, multiple images of the same individual animals were recorded when they lingered in front of the camera trap sensor. A total of 2,778 independent records of 3,269 animals were recorded, with sheep, Cape Spurfowl, Black-backed Jackal and hare sp. nevertheless accounting for the bulk of independent records.

Two non-avian SCCs were included in the Screening Tool output, with Insecta-Aloeides caledoni and Mammalia-Bunolagus monticularis listed as 'Medium' sensitivity. The desktop study revealed two SCCs potentially present in the study site that were not included in the Screening Tool output, namely Grey Rhebok (Pelea capreolus) and Leopard (Panthera pardus). Both Riverine Rabbit and Grey Rhebok were confirmed as present within the study site, while Leopard was considered to have a high probability of utilizing at least parts of the study site on occasion. The Caledon Copper (*Aloeides caledoni*) is considered Least Concern and unlikely to occur in areas identified for development. Riverine Rabbit is considered the primary SCC relevant to the proposed development.

TABLE 6-3 SPECIES OF CONSERVATION CONCERN CONFIRMED OR POTENTIALLY PRESENT ACROSS THE STUDY AREA

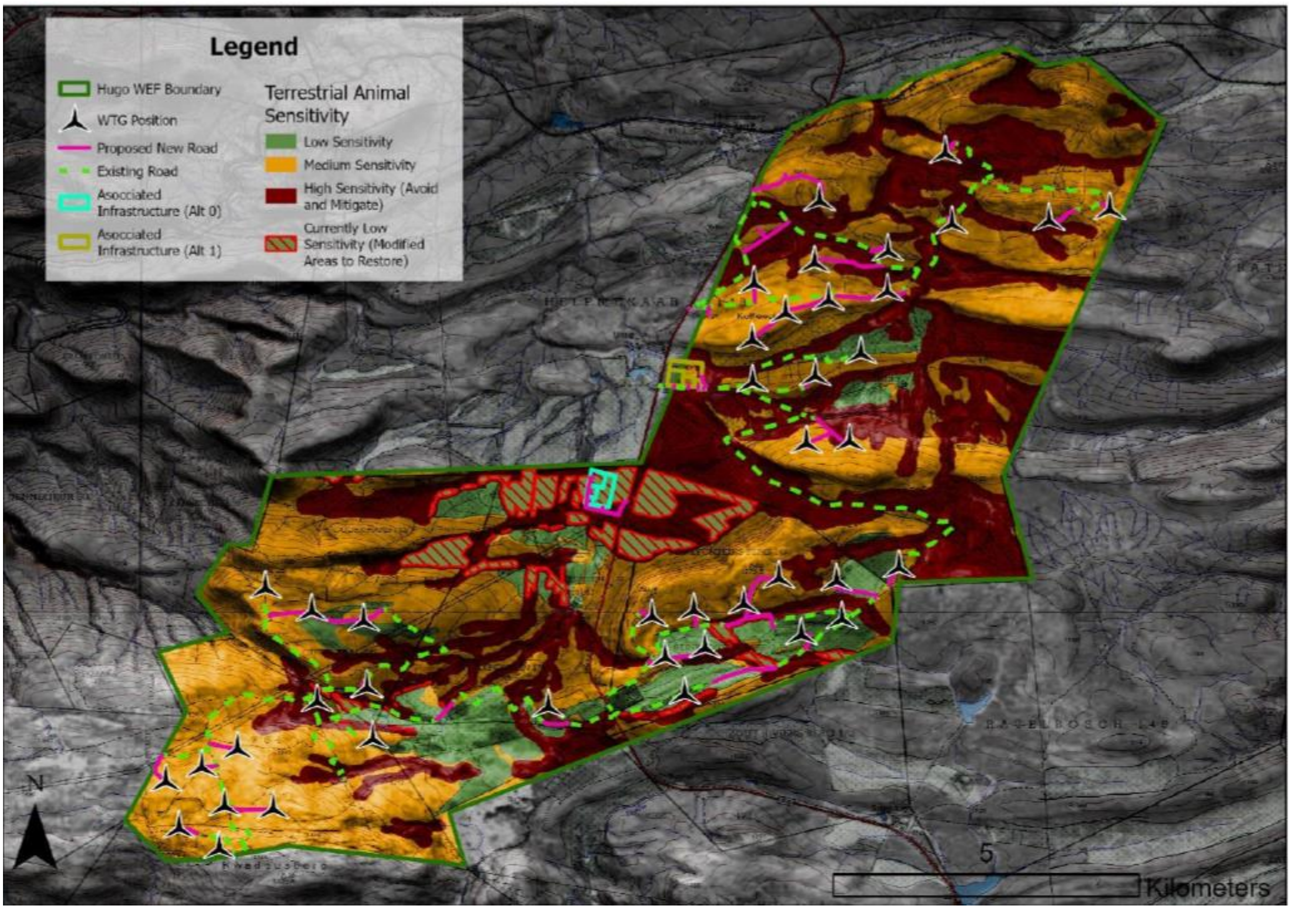
Family	Common Name	Scientific Name	Status	Habitat	Source	Probability	Justification
Leporidae	Riverine Rabbit	*Bunolagus monticularis*	Critically Endangered	Low-lying scrub	Screening Tool	Confirmed	N/A
Bovidae	Grey Rhebok	*Pelea capreolus*	Near Threatened	Scrub, rocky hills and modified fields	Desktop Study	Confirmed	N/A
Felidae	Leopard	*Panthera pardus*	Vulnerable	Scrub and rocky slopes	Desktop Study	High	Site located near suitable habitat of

Family	Common Name	Scientific Name	Status	Habitat	Source	Probability	Justification
							wide-ranging species
Lycenidae	Caledon Copper	*Aloeides caledoni*	Least Concern	Rocky cliffs and mountain peaks	Screening Tool	Low-Medium	Small area of rocky, quartzite ridges present

The sensitivity mapping exercise resulted in drainage lines, alluvial fans and plains, gently undulating-to-flat natural/near-natural and recovered scrub to be categorized as high sensitivity for animal SCCs. Heavily modified agricultural fields were categorized as low sensitivity, except in areas where their presence was undesirable from an overall ecological connectivity perspective and a high sensitivity categorization was retained. Areas of remaining natural/near-natural scrub were categorized as medium sensitivity based on their condition and connectivity across the site (Figure 6-7).

Riverine Rabbit were recorded, with detection rates of one independent record occurring on average every 10.8, 6.8 and 9.5 days at each sampling location respectively. Riverine Rabbit occurrence was not correlated with distance from road, but records were absent from modified agricultural land and from sampling locations with a high number of sheep records. Notably, however, Riverine Rabbit occurrence coincided with natural, or near-natural and recovered land types with elevated mean NDVI values. Riverine Rabbit occurrence in previously modified lands that have recovered through the regrowth of surrounding natural vegetation is encouraging. A large 2021 study, utilizing 150 camera traps in the Sanbona Wildlife Reserve, found that Riverine Rabbit occurrence was conditional on hare absence and was negatively affected by terrain ruggedness. Areas of natural, or near-natural and recovered vegetation associated with flatter areas exist throughout the site, however some connectivity between patches has been removed through agricultural activity and modified into cropland.

FIGURE 6-7 SITE SENSITIVITY MAP FOR ANIMAL SPECIES OF CONSERVATION CONCERN



6.2.8 AVIFAUNA

6.2.8.1 STUDY AREA

Bird habitat in the region consists of Matjiesfontein Shale Renosterveld and these were present on the highland area above the valleys where agricultural areas were concentrated. The 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 were found, with the main land-use being sheep farming. Some of the farm dams provide ideal habitat for Blue Cranes that were found foraging on the agricultural lands.

Black Harriers, that favour natural vegetation, were recorded foraging there, and they also passed low over some of the agricultural fields.

A natural and permanent deep pool and wetland was evident in the northern section of the site (Figure 6-8) provided a permanent source of water for birds, and habitat for nesting Hamerkops.

FIGURE 6-8 A NATURAL DEEP-POOL WETLAND FED BY A WATERFALL FROM THE 10-15M HIGH CLIFFS AT THE TOP OF THE PICTURE

Power lines run through the centre of 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 Martial Eagles while surrounding cliffs, also off site, provide suitable breeding cliffs for Verreaux's Eagles.

6.2.8.2 SCREENING STUDY

The initial assessment of the Hugo site combined the SABAP2 records (n = 80 cards from 14 pentads) and the results of first bird surveys in January 2022. This revealed:

- 206 species of bird have been recorded by SABAP2 data around the site;
- 21 of these species are Priority (top 100) collision-prone species;
- 7 of the 21 Priority Collision-prone species are Red Data (RD) species from SABAP2 data;
- 4 of the 7 Red Data species likely to occur (SABAP2) was recorded over the proposed Hugo site (Table 6-4); and
- No nests of Priority species were found on the site.

All (21) Priority collision prone species in the top 100 Priority species including the (7) Red Data birds (in red) recorded in bird atlas data (2008-2022) around the proposed Hugo WEF site. The (9) grey-shaded species occurred in the proposed WEF in the January 2022 site visit. Those with reporting rates over 10% are regarded as relatively regular visitors to the area (Table 6-4).

TABLE 6-4 PRIORITY COLLISION-PRONE SPECIES

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

6.2.8.3 SENSITIVITY

The Hugo study is ranked as low sensitivity from a national avifaunal perspective. However, the DFFE Screening tool https://screening.environment.gov.za/screeningtool/#/app/screen_tool/Wind did not support this classification, as it ranked the area as High Sensitivity for the Animal Species Theme. The main reason for the triggered high sensitivity was the presence of Vulnerable Verreaux's Eagles Aquila verreauxii.

This was verified during the field work in which Verreaux's Eagles were recorded just outside the western boundary of the site in the Scoping study and an (inactive) Martial Eagle nest about 670 m east of the north-eastern boundary was located in February 2022.

While Black Harriers were not recorded on the Hugo site in the Scoping Report they were subsequently recorded in more appropriate seasons (spring), and this verifies:

- The SABAP2 data Reporting Rate suggesting birds will occur with 19% likelihood; and

- the Black Harrier Habitat Suitability Model (HSM: In Simmons et al. 2020) predicts that the habitat in the western section has a 20-40% probability of holding breeding Black Harriers.

This Endangered species was incorporated into the risk assessment undertaken by the CRM.

The DFEE Screening Tool Theme for Wind energy facilities and Birds ranked the area as Low Sensitivity. Thus, while the Birdlife Sensitivity Map concurs with the DFFE Screening Tool for Wind energy facility and birds, both disagree with the Screening Tool output for the Animal Theme. We agree with the Animal Theme that the site is of High Sensitivity given the number of Red Data species.

Southern Black Korhaan (49 flights), Blue Cranes (41) and Verreaux's Eagles (41) were the most common species encountered on site followed by Black Harriers (30 flights) but were present in different habitats. The Korhaans and Blue Cranes occurred on the agricultural field in pairs and threesomes (adults with a youngster). As expected, the eagles were obviously using the ridges.

6.2.8.4 COLLISION PRONE SPECIES

Of the 8 Red Data species the most frequently encountered species was the Southern Black Korhaan, Blue Crane and Verreaux's Eagle performing 79% of all RD flights recorded over the wind energy facility over 12 months. Black Harriers was the next most common species accounting for 18% of all flights (Table 6-5). The Passage Rate for all Priority species was low at 0.36 flights per hour of which the RD species comprised 0.17 flights per hour.

All Collision Prone species (ordered from most to least likely) including RD (in red) species and their individual Passage Rates (flights/hour) on the Hugo WEF and Control sites. Note that only seven with sufficient data could be included in the CRM (marked with *). Those species with fewer than four flights did not reach the threshold for inclusion. Note that while Southern Black Korhaans had adequate data, time spent in the blade swept zone was so minimal that no collision risk could be calculated for it (Table 6-5).

TABLE 6-5 COLLISON PRONE SPECIES

Species	WEF flights	Species Passage Rates*	Control flights	Species Passage Rates	Collision Rank
Number of hours	965 h		62.5 h		
Verreaux's Eagle VU *	41	0.043			2
Martial Eagle EN *	3	0.003			5
Black Harrier EN *	30	0.031			6
Ludwig's Bustard EN	1	0.001			10
Blue Crane NT *	41	0.043			11
Lanner Falcon VU	1	0.001			22
S Black Korhaan VU *	49	0.051			35
Jackal Buzzard *	36	0.04	1	0.02	42
Peregrine Falcon	3	0.003			45
Booted Eagle *	46	0.048	1	0.02	55

Species	WEF flights	Species Passage Rates*	Control flights	Species Passage Rates	Collision Rank
Pale Chanting Goshawk	73	0.076	10	0.2	73
Grey-winged Francolin	2	0.002			82
African Harrier Hawk	2	0.002			85
Black-winged Kite	1	0.001			96
Greater Kestrel	5	0.005			97
Spotted Eagle Owl	14	0.015			100
Totals: 7 RD species 9 LC species	166	0.172	12	-	
	182	0.19		0.192 flights/h	
All Priority species (n = 16	348	0.365			

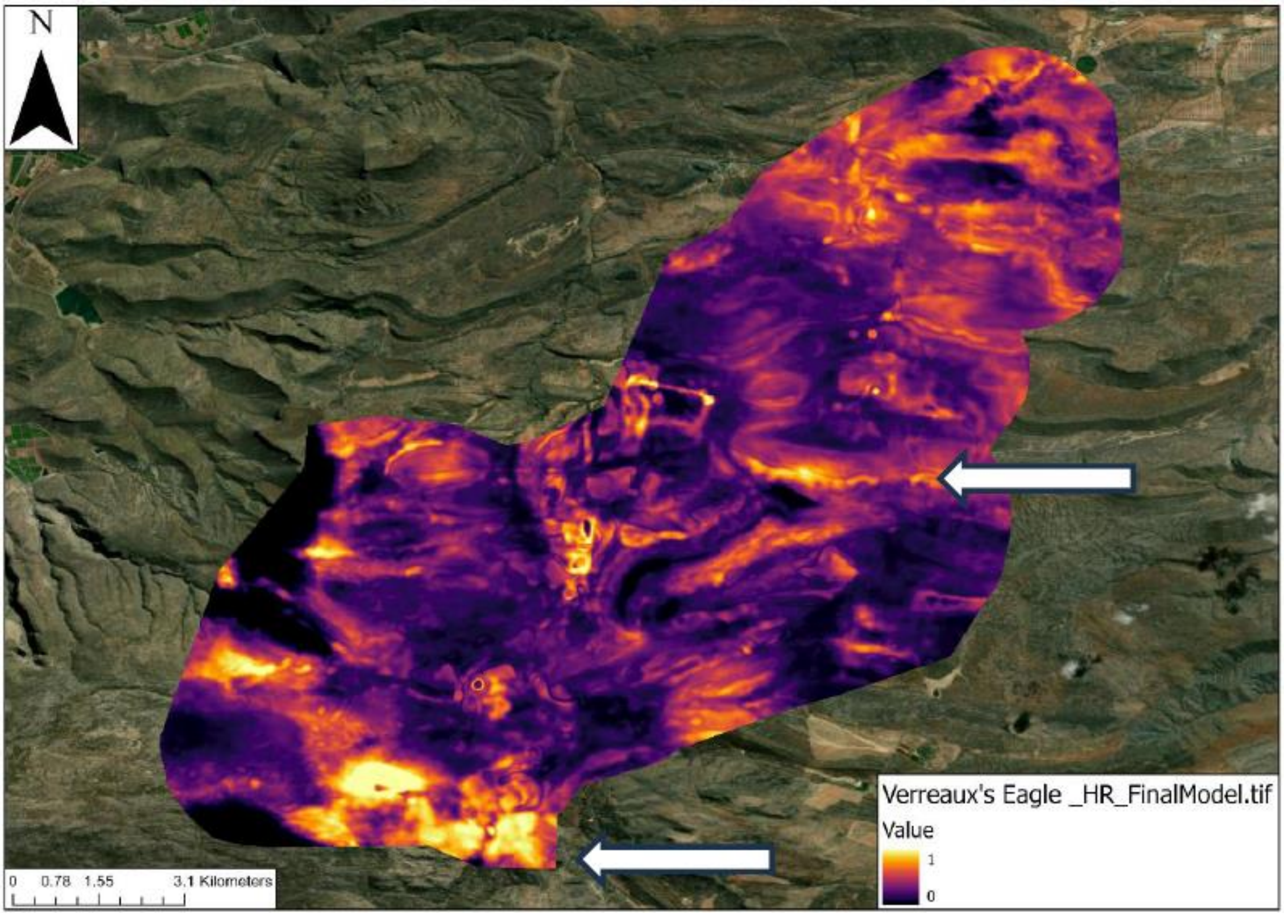
6.2.8.5 BLACK HARRIERS, BLUE CRANES AND VERREAUX'S EAGLES

Southern Black Korhaan (49 flights), Blue Cranes (41) and Verreaux's Eagles (41) were the most common species encountered on site followed by Black Harriers (30 flights) but were present in different habitats. The Korhaans and Blue Cranes occurred on the agricultural field in pairs and threesomes (adults with a youngster). As expected, the eagles were obviously using the ridges (Figure 6-8).

Black Harriers were recorded in the south-west and central eastern areas of the proposed farm. An adult and a juvenile were also recorded from the central eastern areas on 6 and 8 March 2022. However, no nest or other breeding activity was recorded over the 12 months monitoring.

Sufficient data for future modelling for seven Priority species in 965 hours of systematic VP observations over four seasons in 2022 in the WEF were recorded. Of these five were RD species and two were LC (Table 6-4). However, one of these (Southern Black Korhaan) did not occur often enough in the Blade swept area to compute a risk score. Therefore, the risk models below compute risk zones for the red data Black Harriers, Martial Eagles, Verreaux's Eagles, and Blue Cranes and Least Concern Jackal Buzzards and Booted Eagles.

FIGURE 6-9 INDIVIDUAL CRM MAP OUTPUT FOR VERREAUX'S EAGLES THROUGHOUT THE HUGO STUDY SITE TO ILLUSTRATE THE TYPE OF RISK MAP RESULTING FROM THE MODELLING THE HIGHER RISK AREAS (ARROWED) ARE DENOTED IN LIGHTER COLOURS (PROBABILITY OF OCCURRENCE = 1.0), AND LOWER RISK AREAS (UNLIKELY TO OCCUR) ARE DARKER COLOURS



6.2.8.6 NEST BUFFERS

Note the presence of a precautionary buffer in Figure 6-10 for a Martial Eagle nest discovered during field work just outside the north-eastern boundary. Had this nest been active, a buffer of 5.7 km would have been required (Dr G Tate, EWT). However, observations throughout the year, and the CRM outputs, both indicate little activity. Therefore, the buffer has been reduced to a precautionary 3 km, on the possibility that it becomes active in future years. This buffer also encompasses a sighting of an adult and young Black Harrier, but for which no nest site could be confirmed.

The final spatial risk maps for RD species and LC species are respectively shown below in Figure 6-10 and Figure 6-11. The two risk maps for RD and LC species are combined in Figure 6-12.

The final turbine layout shown in Figure 6-12 indicates 42 proposed turbines, all of which avoid the riskiest areas predicted by the CRM and lie outside the precautionary 3 km buffer.

FIGURE 6-10 THE COMBINED CRM RISK VULNERABILITY MAP FOR THE FOUR RD SPECIES, BASED ON 12 MONTH'S MONITORING OVER ALL SEASONS FOR THE PROPOSED HUGO WEF

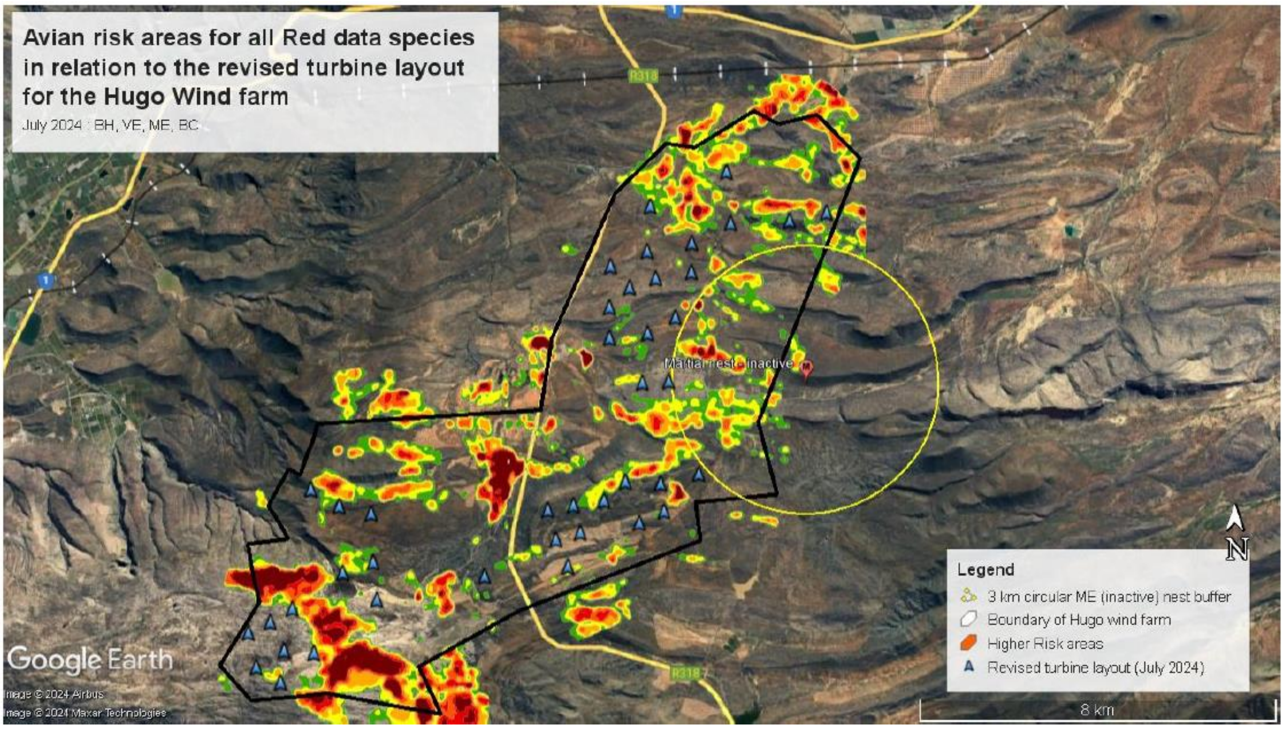


FIGURE 6-11 COLLISION RISK MODEL VULNERABILITY MAP FOR THE TWO LEAST LC SPECIES, BASED ON 12 MONTH'S MONITORING OVER ALL SEASONS FOR THE PROPOSED HUGO WEF

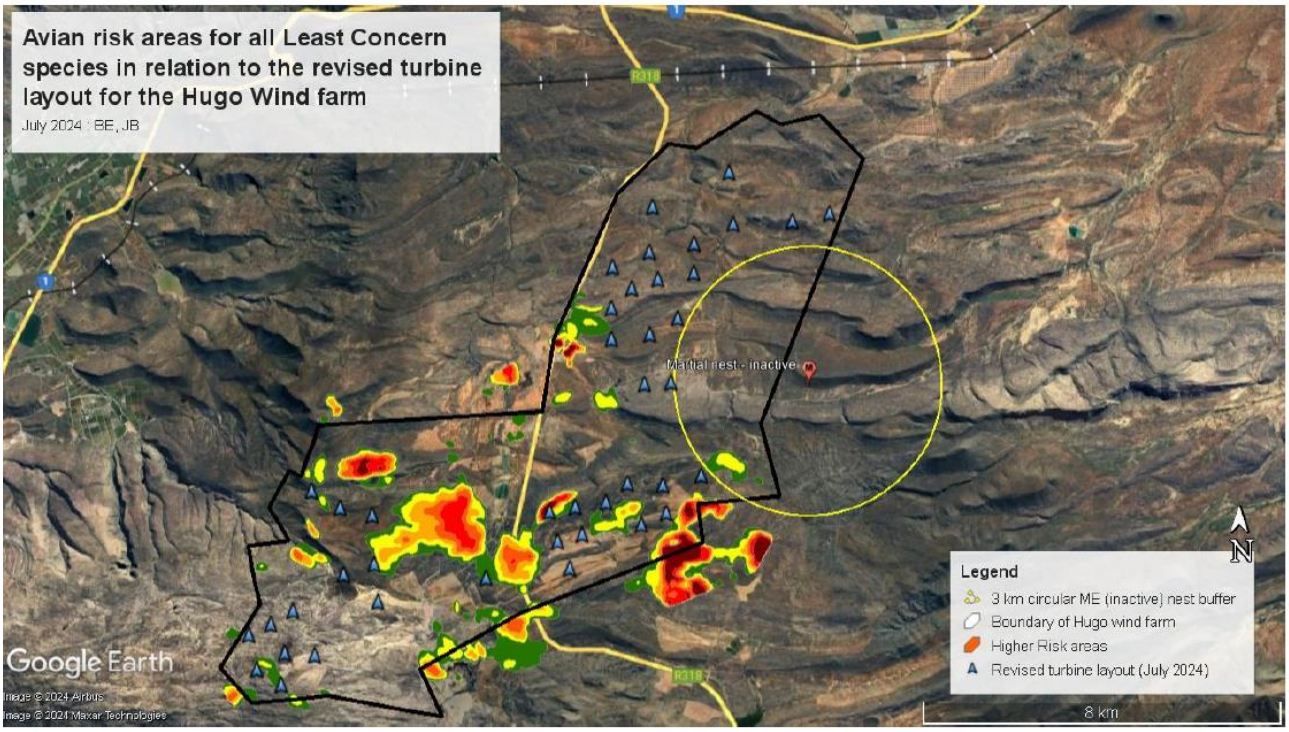
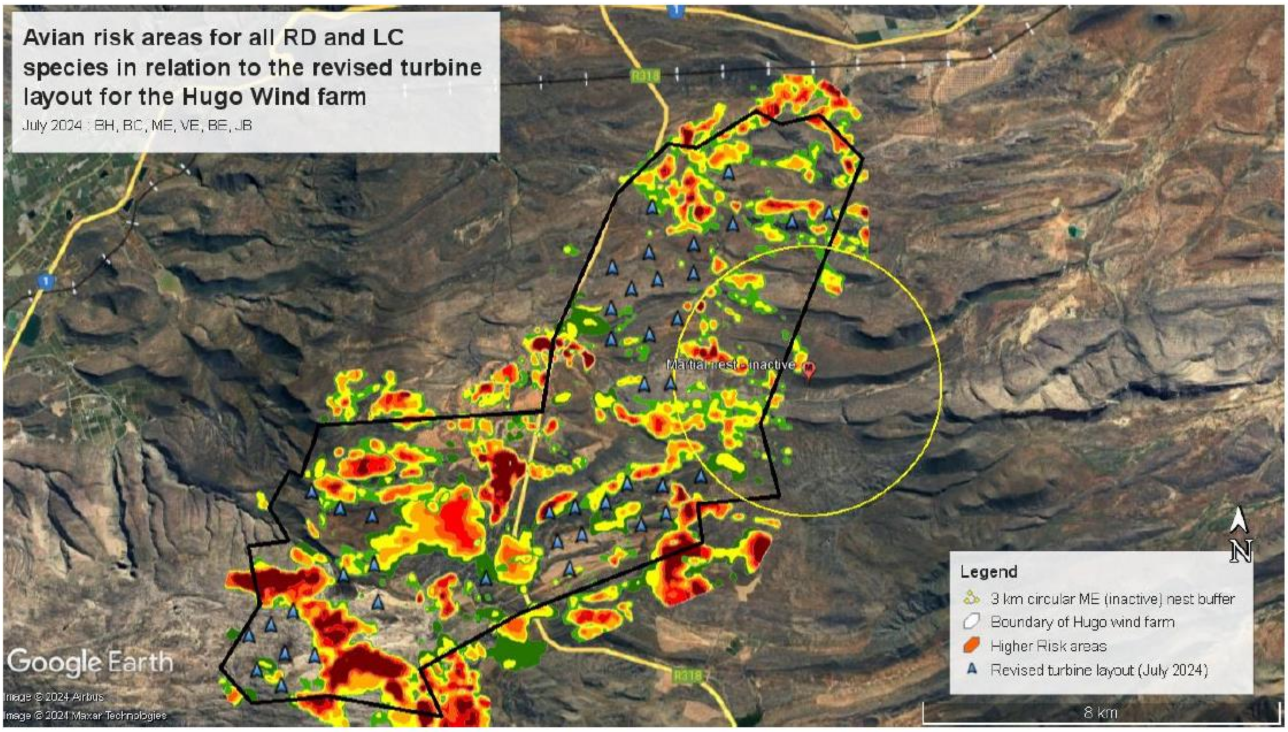


FIGURE 6-12 THE COMBINED CRM RISK VULNERABILITY MAP FOR THE FOUR RD AND TWO LC SPECIES, BASED ON 12 MONTH'S MONITORING OVER ALL SEASONS FOR THE PROPOSED HUGO WEF



6.2.9 BATS

Relatively denser vegetation situated in the non-perennial riverbeds as well as limited trees near houses could provide roosting opportunities for bats that prefer roosting in vegetation or under the bark of trees. Ample roosting habitat is available in man-made structures as well as rock formations in the hills and valleys on site as well in the surrounding areas, especially the neighbouring southern part of the development.

The proposed wind farm falls within the distributional ranges of six bat families and approximately 12 bat species. Table 6 6 is informed by the most recent distribution maps of Monadjem et al. (2010 and 2020) as well as the most recent IUCN and SANBI (2024) species lists.

Of the 12 bat species that have distribution maps overlaying the proposed development area, three have a Near Threatened status, one has a Vulnerable conservation status in South Africa, while two have a global conservation status of Near Threatened. *Eptesicus hottentotus* (Long-tailed house bat), *Cistugo seabrae* (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 2020).

Of the 12 bat species that have distribution maps overlaying the proposed development site, there is one with a Near Threatened conservation status in Southern Africa, namely *Cistugo seabrae* , and one with a Near Threatened Global conservation status, namely *Eidolon helvum* (African straw-coloured fruit bat). *Eptesicus hottentotus*, *Cistugo seabrae*, and *Rhinolophus capensis* are endemic to Southern Africa and have limited suitable habitat left, mainly due to agricultural activities (Monadjem 2020).

The latest Pre-Construction Guidelines identify the likelihood of fatality risk (MacEwan et al 2020). Based on this, six species have a high risk of fatality due to their foraging habits or migration at high altitudes, namely *Tadarida aegyptiaca*, *Sauromys petrophilus*, *Laephotis capensis, Miniopterus natalensis* and the two fruit bat species, *Eidolon helvum* and *Rousettus aegyptiacus*. *Myotis tricolor* has a medium-high risk and *Eptesicus hottentotus* a medium risk of fatality.

The two fruit bats are not expected to roost on the project site itself. Due to the lack of fruit trees in the area, this environment is not expected to be their preferred habitat. However, the proximity of the mountains around the site, the agricultural activities of the Hex River 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. The possibility that they could sporadically be present at the development area should not be ruled out.

Rhinolophus clivosus (Geoffroy's horseshoe bat) was recorded in the surrounding area, but not on the Hugo terrain yet. There is a high likelihood that some of the bat species belonging to the genus Rhinolophus might occur in the more densely vegetated valleys. As indicated by Table 6 6 these bats are clutter foragers and have a low likelihood of fatality risk.

TABLE 6-6 POTENTIAL BAT SPECIES OCCURRENCE ON THE PROPOSED HUGO WEF (MONADJEM ET AL. 2010 AND 2020)

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 Hugo and surroundings	Bats recorded on the Hugo project site
PTEROPODIDAE	*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		
MINIOPTERIDAE	*Miniopterus natalensis*	Natal long-fingered bat	Least Concern	Least Concern	Caves	Clutter-edge, insectivorous	Seasonal, up to 150 km	High	✓	✓
NYCTERIDAE	*Nycteris thebaica*	Egyptian flit-faced bat	Least Concern	Least Concern	Cave, Aardvark burrows, road culverts, hollow trees. Known to make use	Clutter, insectivorous, avoid open grassland, but might be found in drainage lines	Not known	Low		

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 Hugo and surroundings	Bats recorded on the Hugo project site
					of night roosts.					
MOLOSSIDAE	*Tadarida aegyptiaca*	Egyptian free-tailed bat	Least Concern	Least Concern	Roofs of houses, caves, rock crevices, under exfoliating of 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. Night roosts used	Clutter, insectivorous		Low	✓	

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 Hugo and surroundings	Bats recorded on the Hugo project site
VESPERTILIONIDAE	***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, insectivorous	Not known	High	✓	✓
	Myotis tricolor	Temminck's myotis	Near Threatened	Least Concern	Roosts in caves, but also 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, insectivorous	Not known	Medium	✓	✓
	Cistugo seabrae	Angolan wing-gland bat (endemic)	Vulnerable	Near Threatened	Possibly buildings, but no further information	Clutter-edge, insectivorous	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).*

Higher activity was portrayed approximately two hours after sunset, when bats emerged to forage and drink water, with a peak in activity around three hours after sunset. Steady high activity occurred for the first seven hours after sunset, between 20:00 and 22:00, and a significant decline in activity is shown from 22:00 to approximately two hours before sunrise. These patterns are of importance if mitigation measures are to be developed, as they indicate the most active periods during the night.

A detector was deployed during the night of 12 August 2023, at a dam adjacent to the farm dwelling of Helpmekaar/Nadini farm. The results indicate an abundance of *Laephotis capensis*. This species represents the majority of activity at the lower systems on the proposed wind energy facility and the high number of calls within these parameters recorded at the point source confirms the general high activity of *Laephotis capensis*. The presence of *Miniopterus natalensis* and *Tadarida aegyptiaca* also confirms the presence of these bat species at the proposed development. Further point sources, during April 2024 did not record any activity. Probably due to colder weather during this field work session.

Bat Species Diversity

If the combined data of all systems are taken into consideration the high-flying *Tadarida aegyptiaca*, which has a narrow wing morphology adapted for open air, is the most abundant species (53%) followed by 38% of the calls by *Laephotis capensis*. 4% of the overall activity recorded was similar to *Miniopterus natalensis*, 4% was *Sauromys petrophilus,* and 1% of the endemic *Eptesicus hottentotus*. Apart from *E. hottentotus,* with a medium risk of fatality, all these species are bats that tend to fly at high altitudes resulting in a high risk of collision or barotrauma from the wind turbines (MacEwan et al., 2020).

The species diversity is to a large extent similar for Systems A, at 100 m, and System B, at 50m, on the met mast. As portrayed by Figure 6-13, the activity of *Tadarida aegyptiaca* is significantly higher at high altitudes. 95% of the activity at both high altitude systems, 100 m (System A) and 50 m (System B), was represented by this species. Apart from system L, where 61% of the activity represented calls like *Laephotis capensis*, the low altitude systems C, J and K, were also dominated by *Tadarida aegyptiaca. Laephotis capensis* portrayed a larger representation at the 10 m systems if compared to the systems at height, as this species is known to forage in all kinds of environments, utilising open air and clutter, whereas *Tadarida aegyptiaca* is by preference an open-air forager.

FIGURE 6-13: SPECIES DIVERSITY RECORDED AT EACH SAMPLING POINT. THE FOLLOWING SPECIES CODES WERE USED; EPHOT = *Eptesicus hottentotus*, LAECAP = *Laephotis*

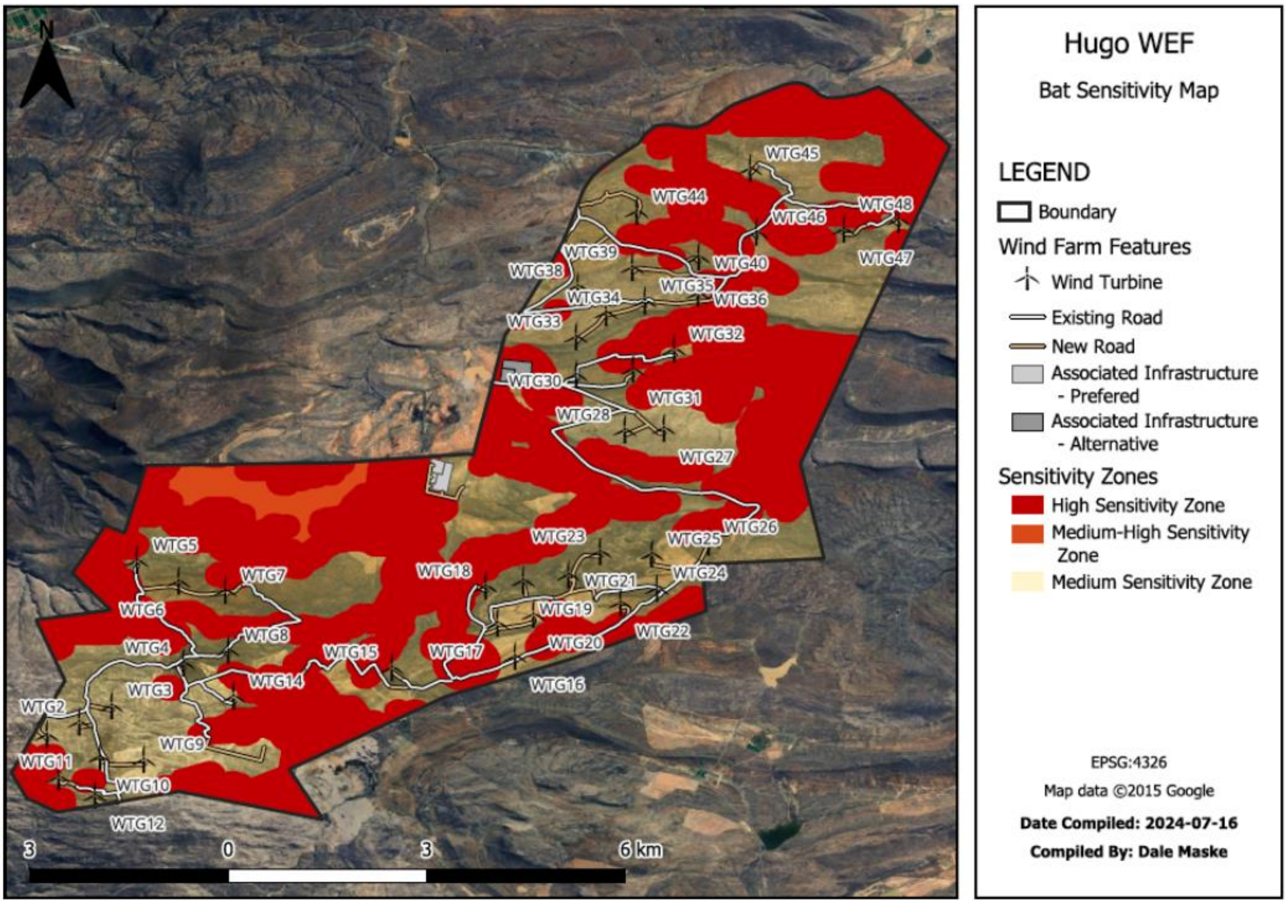
Capensis, TADAEG = *Tadarida aegyptiaca*, MINNAT = *Miniopterus natalensis* AND SAUPET = *Sauromys petrophilus*

Sensitivity

The bat sensitivity zones (Figure 6-14) were established based on the buffer zones as indicated by the South African Good Practice Guidelines for Pre-construction Monitoring of Bats at Wind

Energy Facilities. The sensitivity zones were refined through field visits and visiting the bat conducive environment occurring at the development site, as well as through the static bat monitoring data and point sources.

FIGURE 6-14 BAT SENSITIVITY MAP OF THE PROPOSED HUGO WEF



High sensitivity zones should be treated as no-go areas for any moving components of turbines. The following features, which could encourage bat presence either at present or in the future, have been buffered as prescribed by the pre-construction bat monitoring guidelines (MacEwan et al. 2020) at the proposed Hugo WEF. The minimum buffer recommendation from SABAA is a 200 m buffer around all potentially bat important features. If two or more points of interest are in close vicinity, they are linked, to form an ecological corridor. The general high bat activity combined with the following features were motivation for the high sensitivity zones:

Open water sources, such as reservoirs, water troughs for livestock, dams, and pans (some of these are historic, but could be used in future) – 200 m buffer;

- Rivers – 200 m buffer;
- Riparian shrub – 200 m buffer;
- Relatively dense thicket – 200 m buffer;
- Rock formations, rocky outcrops, and features which are conducive to bat roosts – 200 m buffer; and
- Human dwellings – 500 m buffer.

It is recommended that mitigation measures are installed if medium-high sensitivity zones are encroached. Should any moving turbine components encroach into medium-high sensitivity zones, curtailment must be applied. The medium-high sensitivity zone areas were motivated as follow:

- Slopes where there is a relatively low occurrence of rock formations and crevices, but which are favourable for bat activity; and
- Dry runoffs with minimal riverine vegetation. The guidelines stipulate high sensitivity for rivers and areas containing water, but some of these dry ditches only have water during rainy spells and very limited riverine vegetation. Although the area often receives some rain in spring, from October to November, the area is classified as a winter rainfall area. During the colder winter months when there is expected to be water collecting in these dry runoffs, bats are less active.

Due to the general high bat activity for all systems, the rest of the site is classified as medium sensitivity. It is recommended that wind development is allowed on the terrain, but with mitigation as described in Section 10.7 and in the EMPr.

6.3 HERITAGE AND ARCHAEOLOGY

The South African interior has been occupied by people for hundreds of thousands of years as testified by the vast "litter" of stone artefacts that blanket the landscape and which range from heavily weathered Early (ESA) and Middle Stone Ages (MSA) lithics, the former dating back as much as half a million years ago, to the more recent Later Stone Age (LSA) artefacts deposited within the last 30 000 years.

There has been little previous archaeological research around the proposed Hugo WEF and desktop information available for this report was limited to a small number of previous archaeological assessments in the region.

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 ESA or MSA) amongst which no diagnostic formal elements were noted" (Halkett 2012:8).

Kaplan has undertaken two archaeological assessments to the north-east of the Hugo WEF towards Touws River. In 2010 he surveyed an area at Nouga proposed for agricultural expansion and recorded large numbers of scattered stone artefacts dating from the Middle and Later Stone Ages. He also located what he referred to as a LSA factory site with many stone artefacts, including several formal tools (Kaplan 2010). His second assessment was for the proposed Vredefort solar energy facility south of Touws River, where he again 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 inland of and located about 350 m lower than the mountainous and hilly Hugo WEF study area (Kaplan, 2015).

Most recently, Orton (2023) conducted an archaeological assessment for the proposed Ezelsjacht WEF, which is located immediately adjacent to the Hugo WEF in the south. The results of Orton's 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. Also reported were some historical archaeological resources comprising mainly stone-walled kraals (Orton, 2023).

A larger number of archaeological assessments have been conducted in the Hex Valley and below the Langeberg around Robertson, but the environment in these areas is so different to the Hugo WEF study area that the heritage resources present there are not relevant to the current study.

Based on Orton's (2023) findings at the adjacent Ezelsjacht WEF and in common with many other projects on high-lying terrain, it was assumed prior to the TerraMare Archaeology site visit that Stone Age resources in and around the Hugo WEF would be rare.

This was confirmed by the archaeological site visit undertaken in April 2024, which found very little pre-colonial archaeological material and only a couple of colonial period sites within the area that will form part of the Hugo WEF development footprint. The details of these sites are provided in Volume II.

The most notable archaeological occurrence was an open scatter or late Earlier / early Middle Stone Age lithics found eroding out of the red alluvium in a deflating, unvegetated area next to a gravel road on the farm Helpmekaar. The occurrence is in a wide valley bottom and suggests that the lithics were deposited next to a small river or steam. The artefacts are almost exclusively made on a grey quartzite and included cores, flakes and chunks. The scatter was thin, but artefacts were noted for some distance along the road. This site will not be affected by the current layout of the WEF.

Potentially archaeologically sensitive areas in the landscapes like that of the Hugo WEF include springs, pans and watercourses because of the natural resources they offered and attracted, outcrops of rock suitable for stone tool making, and rock shelters or overhang on the skirts or slopes of hills and mountains for the shelter they could provide.

The low archaeological signature of the Hugo WEF area is in part due to the geology of the area where caves and rock shelters are rare. It is also the result of the exposed high ground where much of the Hugo WEF infrastructure will be placed, and which is unlikely to have attracted more than passing prehistoric human use and occupation and where the presence of archaeological sites and material is the exception rather than the rule.

6.3.1 HISTORICAL BUILT ENVIRONMENT

In terms of the National Heritage Resources Act, any built structure older than 60 years is considered to be historical and enjoys protection under the Act.

Available historical survey diagrams for the farms within the Hugo 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 centred 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 (1969), aerial photography dating from the 1940s and 1960s and modern satellite imagery in a GIS indicates that only two farming settlement nodes within the Hugo WEF: at Stinkfontein (Re/172) and on Helpmekaar (9/148).

Two farmhouses are marked next to a fountain at Stinkfontein on the 1885 Surveyor-General diagram for the adjacent farm, Stinkfonteins Berg (Re/147) and TerraMare Archaeology site visit confirmed the presence of an old farm complex on Stinkfontein (Re/172).

A number of packed stone historical kraals and farm buildings were recorded, including a threshing floor and a small, restored thatched cottage was noted on the farm side of the farm dam. It is possible that the current farmhouse contains an older core but if so, the building has been substantially modernized and no external evidence of an older building is visible.

6.3.2 GRAVES AND BURIALS

A small historical cemetery dating from the late 19th – early 20th century and containing three marked Hugo graves was recorded within the farm complex at Stinkfontein.

No other identifiable graves were recorded within the WEF development footprint during the site visit.

Pre-colonial graves could occur almost anywhere in the WEF area, but the remote and mountainous nature of the area where much of the WEF infrastructure is proposed 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.

6.3.3 ENGRAVINGS AND ROCK ART

A small overhang with several well-preserved rock paintings was recorded during the site visit on the farm Helpmekaar (9/148).

The site is located on a narrow ravine where water draining from the surrounding hills is channelled between two hills. The overhang is very shallow and but contains several painted panels tucked under overhanging rocks. There appear to be several periods of painting represented, with overpainting evident in places.

Subject matter includes finely painted polychrome human figures, what appears to be a very large polychrome eland, a small antelope, possible hartebeest or bontebok, a possible felid, a white painted bovid and various instances of finger dots, which tend to overlie previous paintings.

6.3.4 CULTURAL LANDSCAPE

The landscape within which the Hugo WEF is proposed, the geology and climate of the area have produced rugged landforms characterised by steep hills and mountainsides in the west and south which are largely natural and undeveloped. On the lower slopes and valley bottoms in the across much of the WEF, the landscape contains a patchwork of historical dryland oat and wheat fields.

The paucity of natural landscape features that could have served as foci for pre-colonial human activities and the apparent lack of archaeological and other heritage sites on the project site suggest that the landscape of the Hugo WEF project site was of limited significance to, and thus lightly used and occupied by a succession of pre-colonial people.

The modern land-use on the WEF site and surrounding area does not significantly alter its natural character. The area is remote and sparsely populated, and the landscape is largely natural and with only a light agricultural overlay comprised of dryland field, gravel roads, occasional farm tracks, fence lines, and the handful of historical built environment nodes described earlier.

In their Inventory and Policy Framework for Heritage and Scenic Resources, Winter and Oberholzer (2013) identify the R318, which is straddled by the Hugo WEF as a "scenic / linking route of secondary importance". They also define the portion of the N1 directly to the north of the Hugo WEF as a route of major scenic / heritage value.

The proposed Hugo WEF is, therefore, situated in what may be described as an organically evolved, continuing landscape which is overwhelmingly natural, with only a relatively light human imprint.

The construction and operation of the WEF will introduce an industrial element into the landscape which will alter the character or sense of place of the landscape in which it will operate.

6.4 PALAEONTOLOGY

A study conducted for the proposed Ezelsjacht WEF immediately adjacent to Hugo WEF in the south, indicate that the proposed Hugo WEF is underlain by several coastal to shallow marine formations of the Table Mountain and Bokkeveld Groups of the Cape Supergroup, of Early to Middle Devonian age (c. 410 – 390 Ma). It was during this period that the first terrestrial plants, bony fish and insects evolved and spread on the land, from precursors in the seas.

Although southern Africa, located in the middle of Gondwanaland, was positioned over or close to the South Pole and was covered by a series of ice sheets, some of the fine-grained shallow water and marginal mudstones and siltstones have fossils preserved within them. With the repeated cycles of sea level rise and fall and resulting shifts from marine to shoreline to fluvial and delta settings and back again, there is a complex series of environments with the resident fauna.

The Ordovician lower Table Mountain Group preserves trace fossils, and invertebrates such as brachiopods, trilobites, eurypterids, conodonts and chitinozoans. There are records of invertebrate fossils, known as the Malvinokaffric Faunal Assemblage, in the Silurian – early Devonian upper Nardouw Subgroup and the whole of the Bokkeveld Group, while the Witteberg Group has records of fish and plants as well as invertebrates such as brachiopods, bivalves, gastropods and trilobites. More recent research has shown that the Malvinokaffric fauna of Gondwanaland (Bokkeveld Group) is somewhat different from the northern hemisphere fauna.

From the Waaipoort Formation plant remains, such as lycopod stems and ferns, and invertebrate remains such as giant eurypterids and palaeoniscoid and acanthodian fish, have been described.

The Ceres Subgroup has abundant marine benthic (bottom-dwelling) invertebrate fossils such as brachiopods, bivalves, trilobites, cephalopods, crinoids, ophiutoids, hyoliths, cricoconarids, corals and gastropods. These marine fossils occur mostly in the mudrock units while plant fossils occur in the sandstone units. Some units also show extensive bioturbation based on the presence of trace fossils of burrows, such as Planolites, Skolithos and Arenicolites.

The assessment for 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 that project area is much lower than indicated on the SAHRA map. None of the fossil sites recorded in the Ezelsjacht WEF area were very well preserved and all represent common, widely distributed forms, of limited scientific or conservation value.

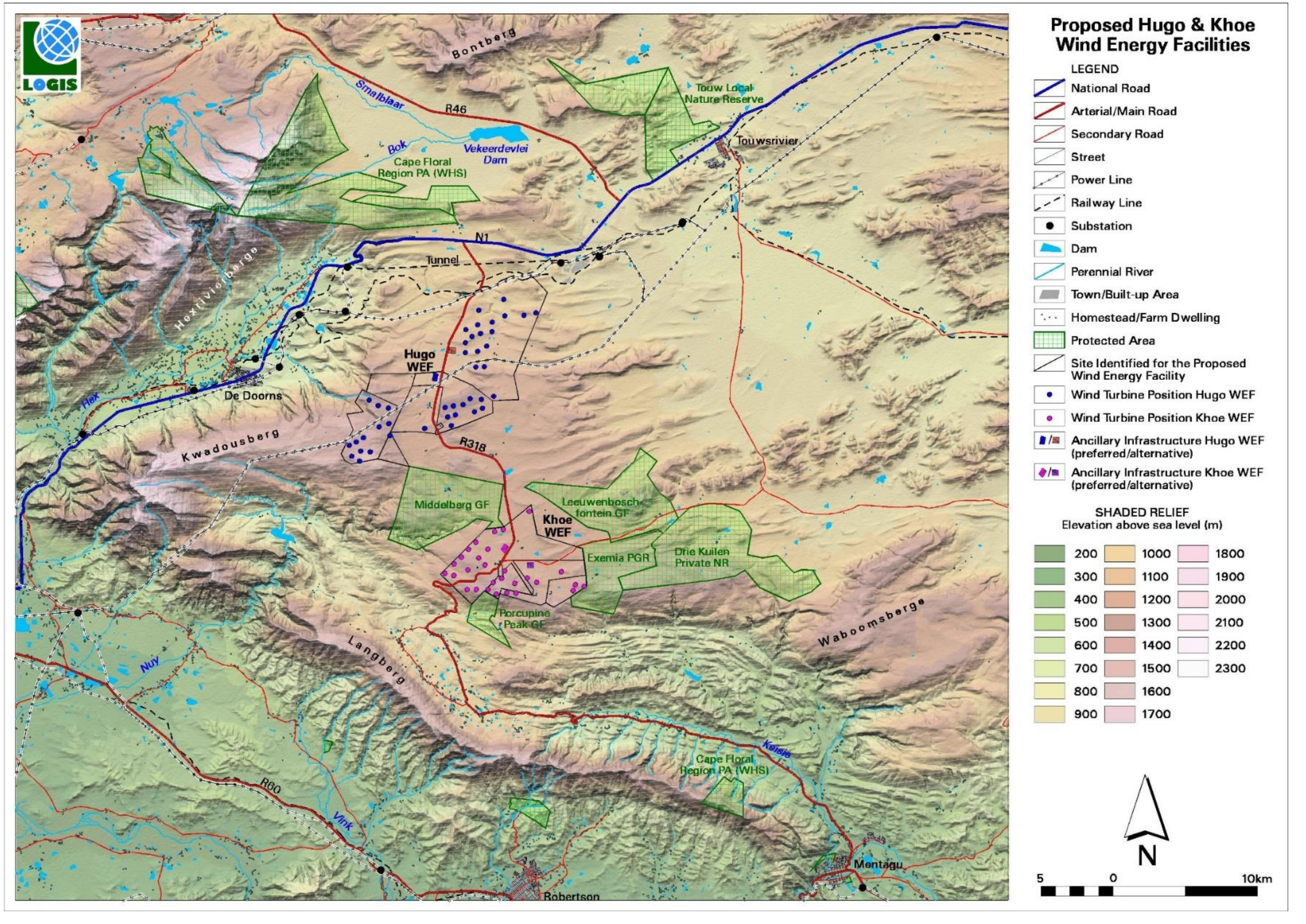
Although it is tempting to assume that the same will apply in the Hugo WEF, the Bokkeveld Group bedrocks probably become less deformed, and hence more fossiliferous, towards the north and away from the influence of the Cape Fold Belt. There are also important Devonian invertebrate fossil sites recorded in the region of Matroosberg Station, on and around De Doorns Tafelberg just to the west of the Hugo WEF development area.

6.5 VISUAL / LANDSCAPE

The proposed Hugo WEF and associated infrastructure is located approximately 16 km south west of the town of Touws River and 30 km north east of Worcester within the Breede Valley Local Municipality within the Western Cape Province.

The study area occurs on land that ranges in elevation from approximately 200 metres above sea level (m asl) in the south west at the base of the Langberg Mountain along drainage lines and in the west along the Hex River to 1,800m asl on the tops of mountain ranges such as Kwadousberg and Langberg. The site itself is located on land with an average elevation of 1,500 m asl. Numerous mountain ranges are located within the study area, namely the Hexrivierberge and Kwadousberg in the west, Langberg 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.

FIGURE 6-15 SHADED RELIEF MAP OF STUDY AREA



There are three formally protected areas within the study area, namely the Cape Floral Region Protected Area, Touw Local Nature Reserve and Drie Kuilen Private Nature Reserve. The Cape Floral Region is also a World Heritage Site as recognized by UNESCO. Drie Kuilen PNR offers a variety of activities such as game drives, hikes and overnight accommodation.

Numerous non-designated private natures reserves and guest farms are also located within the study area, namely Aquila Private Nature Reserve to the north, Middelberg guest farm, Leeuwenboschfontein guest farm, Porcupine Peak guest farm and Exemia Private Game Reserve can be found near the centre of the study area. All of these reserves and farms offer tourist accommodation facilities and activities.

It should be noted that while there are existing buildings on Exemia, the future intent for the property is to develop it into an ecotourism destination consisting of amongst others, a campsite, healing room, wedding venue and other accommodation offerings.

The greater environment with its wide open, undeveloped landscapes is considered to have a high visual quality.

This study area is known as a tourist destination owing to its location within the Cape Winelands, the Cape Floral Region, and the town of Touws River which is located on the Flowers Route. Five tourist accommodation establishments are located approximately 5 km of the proposed WEF, namely, Middelberg Guest Farm, Ezelsjacht Guest Farm, Kamagu Safari Lodge, Matroosberg Stasie and Ratelbosch.

The homesteads and roads expected to be visually influenced are listed below. The identification of these homesteads or farm dwellings are based on their locations as per the SA 1: 50 000 topographical maps. Should a homestead / residence / institution not be listed in terms of the SA 1: 50 000 topographical maps, then it is assumed that the impacts will be similar to the other identified residences within the same proximity radii. It should also be noted that this section of the report focusses only on the potential visual exposure at varying distances and it does not yet refer to visual impact significance or any correlation thereto.

Less than 5km from the wind turbines:

- Kamagu Safari Lodge
- Helpmekaar (Matroosberg Stasie)
- Uitsig
- Nadini
- Ratelbosch
- Vredelus
- Bloukom Huisie
- Soutrivier (Ezelsjacht Guest Farm)
- Middelberg Guest Farm (including the camping site, koshuis and Middelberg Self Catering)
- Various unknown homesteads
- Observers travelling along the N1 National Road and the R318 arterial/main road

Located within a 5 - 10km radius:

- Cape Floral Region Protected Areas
- Karoo1 Hotel Village and Africamps
- Kleinberg
- Kleinstraat (Kamuga Safari Lodge)
- Grootstraat
- Skulpiesklip
- Sandvlei (Guest Farm)
- Simonskloof Mountain Retreat
- Non Pareil & Impangele Mountain Lodge
- Various Unknown homesteads
- De Doorns and outlying
- Hex River Valley Dwellings
- Southern portion of the Middelberg Guest farm
- Western portion of the Leeuwenboschfontein Guest Farm
- Observers travelling along the N1 National Road and the R318 arterial/main road

Located within a 10 - 20km radius:

- Aquila PGR
- Outlying parts of Touws River
- Touw Local Nature Reserve
- Vredefort
- Spes Bona
- Merweda
- Njalo Njalo Safari
- Excelsior
- Nauga
- Drie Kuilen Private NR (including The Top Viewpoint)
- Exemia Private Game Farm – The information was provided by the adjacent landowner, and no development has occurred yet. There are currently no concrete plans for the proposed game reserve.
- Oumuur
- Koo (incl. various dwellings, & Vrugtegeur & Langdam Guest Farms)
- Heinzberg
- Various Unknown homesteads
- Hex River Valley Dwellings
- Observers travelling along the N1 National Road, the R318 and R46 arterial/main roads and various secondary roads

Located beyond 20km:

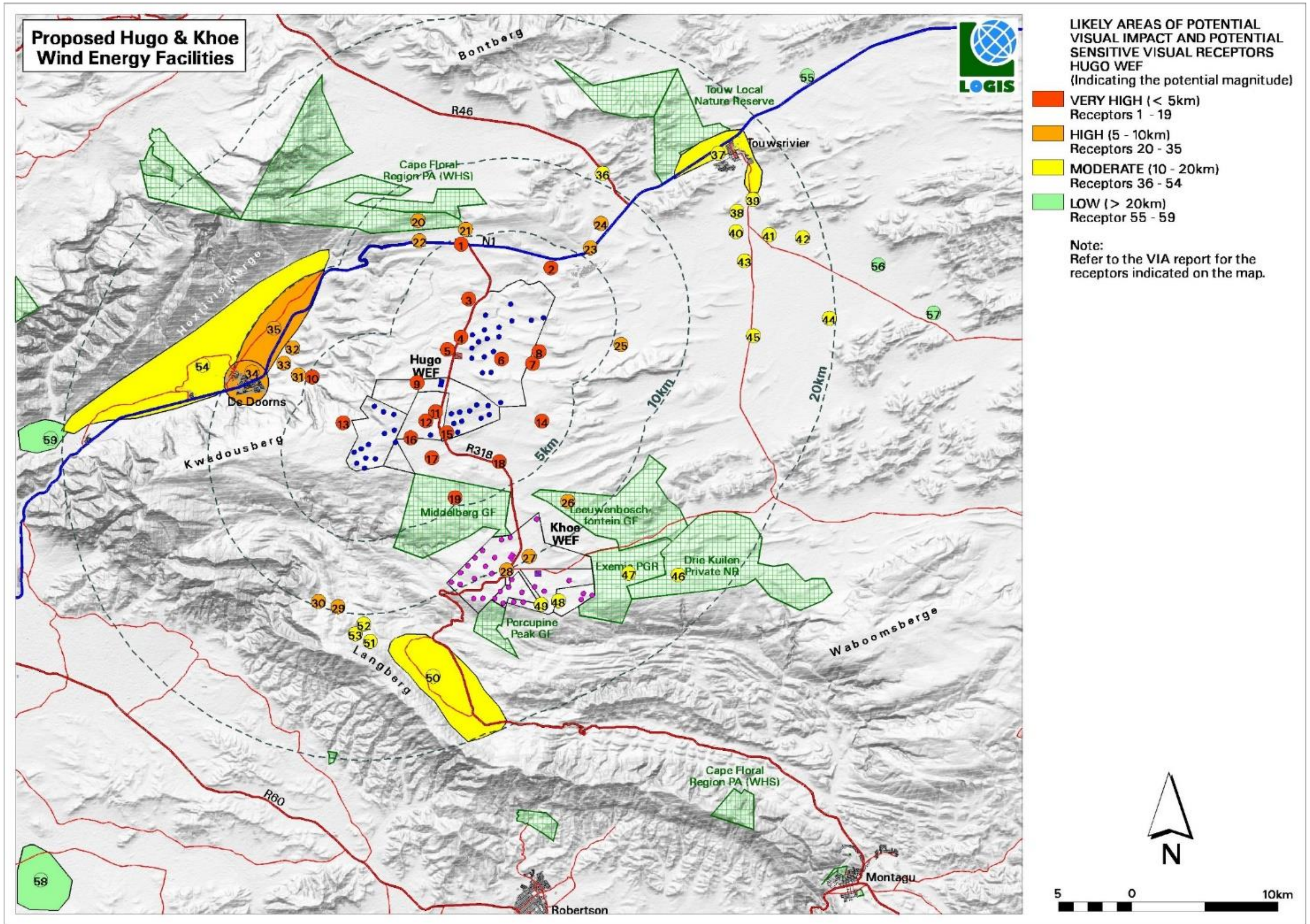
- Rooikoppies
- De Bron
- Blinkwater
- Alfalfa, Thornlands, Welverdiend, etc.
- Sandhills, Klipheuwel, etc.

It must be noted that a small portion of the sensitive visual receptors of farm and homesteads located within the 0-5 km range as listed above, who could be affected visually by the proposed Hugo Wind Energy Facility are in fact located on properties involved with the proposed project. It is therefore assumed that these sensitive receptors are in fact aware of, and to a certain extent accepting, of the visual intrusion associated with WEFs in general as a result of their involvement.

The visual impact index indicates that potentially sensitive visual receptors within a 5 km radius of the WEF may experience a very high visual impact. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; high within a 5 – 10 km radius (where sensitive receptors are present) and moderate within a 10 – 20 km radius (where sensitive receptors are present). Receptors beyond 20 km are expected to have a low potential visual impact.

Likely areas of potential visual impact and potential sensitive visual receptors located within a 20 km radius of the proposed WEF are displayed on Figure 6-16.

FIGURE 6-16 LIKELY AREAS OF POTENTIAL VISUAL IMPACT AND POTENTIAL SENSITIVE VISUAL RECEPTORS



6.6 NOISE

Most dwellings featuring in the vicinity of the project focus area are scattered in a heterogeneous fashion, typical of a rural farming area. Croplands, animal husbandry and limited residential activities (farmers and workers with their families) are predominant in the study area. Minor noise sources are associated with typical household activities and associated subsistence farming. Noise from these sources have not been investigated in this EIA.

Due to the height of the wind turbines, as well as the position where they may be developed (on top of the hills and ridges), it is unlikely that topographical features will limit the propagation of sound from the wind turbines.

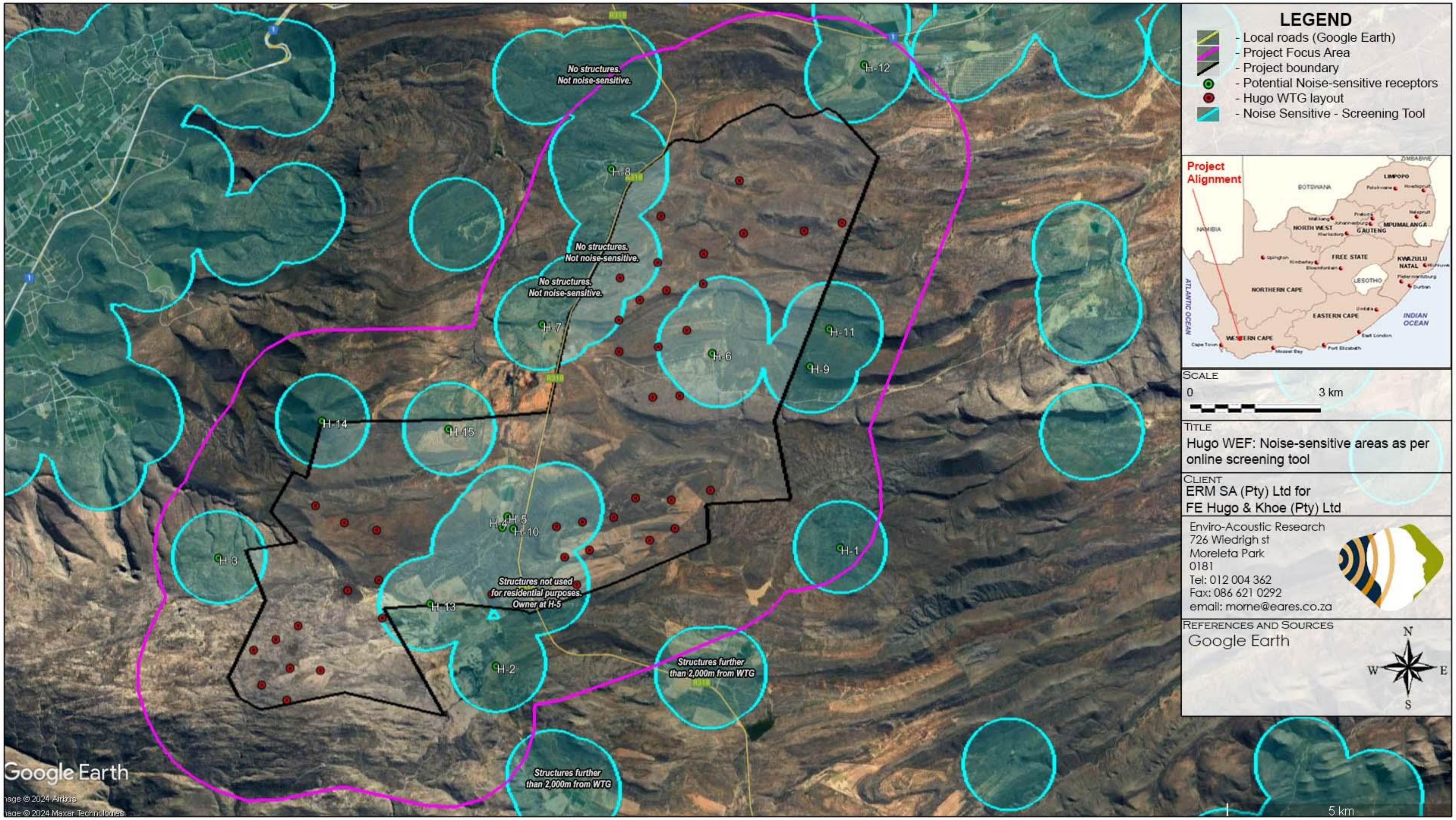
The R318 transects the Project Focus Area (PFA) in the north-south direction, though traffic on this road is generally very low though traffic on this road and does not influence ambient sound levels within the development area. There are several small access roads leading from the R318, mainly to serve the farmers in the area. Traffic volumes on these small access roads are low and are of no acoustical significance.

There are no formal residential areas within 5,000 m from the WEF, with the town of De Doorns located approximately 7.5 km west of the closest wind turbines of the preliminary layout. There are no roads that carry sufficient traffic to be considered of acoustic significance.

Potential Noise-sensitive receptors (NSR) were initially identified using aerial images, as well as the DFFE Screening Tool, with the statuses of the NSR verified during the site visit in December 2022 and September 2023, refer to Figure 6-17 below. The NSR as identified were given buffers of either 500 m, 1,000 m or 2,500 m. Generally, noise from wind turbines, depending on the layout, as well as the specific sound power emission levels of the selected wind turbine:

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

FIGURE 6-17 POTENTIAL NOISE-SENSITIVE RECEPTORS (NSR) IDENTIFIED BY THE DFFE SCREENING TOOL



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

- Daytime fast-weighted sound levels ranged from less than 20.0 to more than 75.0 dBA, with average sound levels being 43.7 dBA. The average equivalent level over the full daytime periods is 54.9 dBA for the 6 measurement locations. Only considering the average fast-weighted values, sound levels are typical of a rural noise district, setting a zone sound level of 45 dBA for the daytime period; and
- Night-time fast-weighted sound levels ranged from less than 20.0 to more than 75 dBA, with average sound levels being 33.1 dBA. The average equivalent level over the full night-time periods is 47.8 dBA for the 6 measurement locations. Only considering the average fast-weighted values as well as the developmental character of the area, a zone sound level of 35 dBA would be used (typical of a rural noise district).

6.7 SOCIO-ECONOMIC

The Hugo WEF site is located in the central portion of the Breede Valley Municipality (BVM). Worcester, located approximately 27 km south-west of the site, is the seat of the BVM and the nearest large town in the region. Other settlements in the BVM include the small towns of Rawsonville, De Doorns, and Touws River. The site is located approximately 7.5 km east of De Doorns, and approximately 15 km south-west of Touws River. De Doorns and the broader Hex River Valley are a major producer of table grapes for the national and export markets. The site is located just north of the boundary with the Langeberg Municipality (LM). Montagu, the nearest town in the LM is located approximately 41 km (linear) south-east of the site. The important stone fruit farming and agri-tourism Koo region is located to the south of the Waboomsberge, midway between the site and Montagu.

6.7.1 POPULATION

The 2021 Socio-Economic Profile for the BVM prepared by the Western Cape Department of Social Development, indicates that the population of the BVM in 2021 was 194,555 making it the second most populated municipality in the Winelands district Municipality. The population is projected to be 200,911 by 2025, which equates to a 0.8 % annual average growth rate. Based on the 2022 Census data the population of the BVM was 212,682. The total number of households was 54,284 with an average household size of 3.9, the same as 2011.

Based on the Stakeholder Engagement Plan (SEP), young children under the age of 15 made up 28% of the population, the working age cohort (15-64) made up 66% and people 65 years and older made up 6%. Based on these figures the dependency ratio was 51%. Based in the data from Census 2022, children under the age of 15 made up 23.4% of the population, the working age cohort (15-64) made up 70.5% and people 65 years and older made up 6.1%. Based on this figure the dependency ratio was 41.9%. 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 64%, followed by Black Africans (22%) and Whites (13%) and. The main first language spoken was Afrikaans (77%), followed IsiXhosa (18%) by English (2%) and (Community Household Survey 2016).

6.7.2 HOUSEHOLDS, HOUSE TYPES AND OWNERSHIP

The 2022 Census data indicates that 87.7% of the households resided in formal dwellings, compared to 77.9% in 2011. This information is worth considering within the context of the 2016 Household Community Survey which found that 70.8% of households lived in formal dwellings, while 20.4% resided in informal dwellings. The 2021 SEP for the BVM provides a figure of 76.2% for the number of formal dwellings. The significant difference between the 2022 Census results and other sources does raise concerns regarding the accuracy of the 2022 Census data, specifically give the influx of jobseekers into the area and the increase in informal settlements in and around De Doorns.

6.7.3 HOUSEHOLD INCOME

During the S&EIA, no data on household income was available from the 2022 Census. The data is therefore still based on 2011 Census. Based on this data, 12.2% of the population of the BVM had no formal income, 1.8% earned less than R 4,800, 2.9% earned between R 5,000 and R 10,000 per annum, 14.9% between R 10 000 and R 20,000 per annum and 22.2% 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 (~ 40,000 per annum). Based on this measure, in the region of 54% of the households in the BVM live close to or below the poverty line. The figures for the CWDM 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 BVM to maintain and provide services.

6.7.4 EMPLOYMENT

The 2021 Socio-Economic Profile for the BVM Municipality notes that the unemployment rate in the BVM has been in the region of 10% over the last 10 years and was 10.7% in 2020. The figures are similar to those for the WDM and lower than provincial figures over the same period. The figure for the Western Cape in 2020 was 18.9%.

6.7.5 EDUCATION

Based on the information contained in the SEP, the matric pass rate in the BVM was 72.5% in 2022, down from 77.1% in 2019 and 82.3% in 2018. After the Witzenberg Municipality, the BVM had the lowest matric pass rate in the Winelands District Municipality (WDM).

6.8 TRAFFIC AND TRANSPORTATION

The hierarchy of the road network in the immediate vicinity of the development is summarised below.

- N1 is a Class 1 National Road 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. 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 has a speed limit of 120 km/h. The length of N1 in kilometres is 1,937 km (Start: Cape Town, End: Beit Bridge Border Post).
- R318: R318 is a Class 3 Provincial Main Road (MR00295) that runs in the north-south direction from the N1 near De Doorns through Montagu to R60 near Ashton. The R318

road passes through the Hex River Valley, which is known for its vineyards, fruit farms, and scenic views. The R318 road has a general posted speed limit of 100 km/h and connects to the R62 road, which is a popular tourist route that links Cape Town and Port Elizabeth. The length of R318 in kilometres is 77.4 km (Start: Jct N1 De Doorns, End: Montagu).

- Road DR01442: Road DR01442 is a Provincial Divisional Road (gravel road), which is a collector road that provides access to Matroosbergstasie to the west of R318. Road DR01442 has a speed limit of 40 km/h. The length of Road DR01442 in kilometres is 0.8km (Start: Jct MR295 Matroosberg, End: Matroosberg Station).
- Road OP05749: Road OP05749 is a Provincial Minor Road (gravel road) to the east of R318 and connects to the south of the N1 National Route. The length of Road OP05749 in kilometres is 22.74km (Start: Jct NR1/3 near Grootstraat Far, End: Jct MR295 on Helpmekaar).
- Road OP05748: Road OP05748 is a Provincial Minor Road (gravel road) to the west of R318. The length of Road OP05748 in kilometres is 7.42 km (Start: Jct MR295 on Zout Riviers Berg, End: Property 171 Ezeljagt & 7 De B).

The site location and layout are such that two primary roads potentially provide access to the proposed Hugo WEF development being the N1 National Road and Main Road R318 (MR00295). Thus, the proposed locations of providing main access to the development are from the existing intersections and accesses off Main Road R318 (MR00295).

Positions of 5 proposed accesses to the site off Main Road R318 (MR00295) are shown in Figure 6-18 and comprise mostly of existing private farm accesses with only one new access location being preferred to provide access to the associated WEF facility infrastructure located to the west of Main Road R318 (MR00295).

FIGURE 6-18 PROPOSED ACCESS LOCATIONS

To understand the effects of additional traffic on the road network, an understanding of existing road network traffic conditions was required. Thus 12-hour manual classified traffic counts were conducted at four (4) key intersections (N1 (Beaufort west - Worcester) and R318 (Montagu). R318 and Road DR01442, R318 and Road OP05749 and R318 and Road OP05748). These traffic counts were carried on Monday, 15 April 2024 between 06h00-18h00.

The volume of traffic on the Main Road R318 is relatively low compared to traffic volumes along the N1 National Road. Similarly, all other roads (Road DR01442, Road OP05749 and Road OP05748) carry very low traffic volumes compared to both Main Road R318 and the N1 National Road. Observed AM and PM peak hour volumes are summarized below:

- N1 National Road: 300 vehicles per hour and 156 vehicles per hour were recorded during the AM peak hour and PM peak hour, respectively, including 56 and 99 heavy vehicles during the respective peak hours;
- Main Road R318 (MR00295): 15 vehicles were recorded during the AM peak hour and 8 vehicles were recorded during the PM peak hour. Only 2 heavy vehicles were recorded during the AM peak hours and 0 in the PM peak hour;
- Road DR01442: A total of 4 vehicles including heavy vehicles were recorded during the AM peak hour and none during the PM peak hour;
- Road OP05749: 3 vehicles and 6 vehicles were recorded in the AM peak hour and PM peak hour, respectively, comprising of light vehicles; and
- Road OP05748: There were no vehicles observed during peak periods on Road OP05748.

7. ASSESSMENT OF ALTERNATIVE

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.

7.1 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 CO_2 emissions, which contributes to global warming. Emissions of sulphureous 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.

If the project were not implemented, then the site would stay as it currently is and likely continue to degrade due to the prevalence of grazing and or erosion within the water courses. This would continue into the long-term with a Low intensity that would impact on the regional scale due to loss of important habitat. Little in the way of mitigation could be proposed due to the social needs of the surrounding residents and their requirement for grazing areas, coupled to the need access. Many fauna species are to some degree negatively affected by farming including many predators which are targeted due to their negative impact on livestock, while some species may also be vulnerable to habitat loss or degradation and may experience depressed populations within the farming landscape. In terms of vegetation and plant species, extensive grazing may result in changes in composition towards less palatable species and a reduction in plant cover. It is however important to recognise that the development does not represent an alternative to extensive livestock farming, but rather an additional impact and stressor independent of the current land use. Overall, the no-go alternative is considered to result in a low negative impact on terrestrial biodiversity.

Although the proposed development will likely affect the avifaunal community on site, they do not appear to have pushed key species towards extinction in most cases. Furthermore, existing impacts to birds, such as agrochemical poisoning (accidental), fence entanglement, road kill, power line electrocution and collision, disturbance of breeding, subsistence hunting, snaring and others, would not be replaced by the proposed project, they would all still persist in addition to the new impacts associated with the wind farm. The No-Go alternative therefore has much lower impacts on avifauna than the proposed project, and would be preferred from an avifaunal perspective. However, since the No-go constraints/buffers have already been taken into account, and with the recommended mitigation measures implemented going forward, the preference for developing the project is also acceptable.

The primary goal of the project is to assist in providing additional capacity to Eskom to assist in addressing the current energy supply constraints. The 'No Development' alternative would not assist the government in addressing climate change, energy security and economic development. 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. Energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement is 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.

Based on the above, the 'No Development' alternative is not a preferred alternative.

7.2 SITE SELECTION

The Applicant identified the Hugo 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 feature, social environment and site accessibility.

Feasibility studies undertaken by the Project Applicant indicated that the Hugo 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 network;
- 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 features 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.

The no development scenario would represent a lost for South Africa to improve energy security. According to all other specialist studies undertaken, the site is suitable for the construction and operation of the WEF.

7.3 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 E&S impacts as far as possible.

Information collated during the scoping phase was used to inform the design of the preliminary WEF and associated infrastructure layout progressively. This approach was adopted with respect to this proposed development, and where potentially significant impacts were identified, efforts were made to avoid these through evolving the design of the proposed development. 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 were used to inform the design for EA of a development.

Various wind turbine designs and layouts were considered for the site in order to maximise the electricity generation capacity and efficiency, whilst taking into account environmental constraints.

During the scoping phase, 48 turbine locations, and two laydown and on-site substation alternative were provided to the specialists. This layout has been adjusted, based on the initial scoping assessment and specialists' findings. Due to the design evolution of the Hugo WEF turbine positions have been revisited. A design evolution summary report is presented in Appendix C of this EIA Report.

The layout of 42 turbines was presented and assessed in full detail during this EIA phase is considered the 'preferred layout' for Hugo WEF development.

7.4 BESS ALTERNATIVES

Unlike conventional energy storage facilities, such as pumped hydro, a BESS has the advantage of being flexible in terms of site location and sizing. Therefore, they can be incorporated into, and placed in close proximity, to a wind or solar facility. They also have the advantage of being easily scaled and designed to meet specific demands.

The function of the BESS will be to store peak kinetic energy produced by the proposed Khoe WEF for use in the following ways:

- To power the operation of the 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 together to form module. With rapid developments in battery technology globally, the EAP has undertaken a high-level desktop study of the BESS. The battery technology under consideration is explained further below, and compared in a table of advantages and disadvantages.

7.4.1 THE NEMA AND BESS

Although international BESS standards are currently being updated, current BESS regulations in South Africa are mostly written for backup power (uninterrupted power supply) applications.

Battery storage does not trigger any listed activities relating to the generation of electricity as technology does not 'generate' electricity, it simply stores electricity generated by a renewable energy facility (proposed Hugo WEF in this instance) and discharges the stored electricity as and when required by the grid. Furthermore:

- A battery is not deemed to be a container; and

- Electrolytes that are used within battery storage facilities: their function is deemed to be like transformers within substations: converting high voltage electricity to lower voltage electricity for further distribution. The function of the battery is not for "storage" or "storage and handling" of a dangerous good.

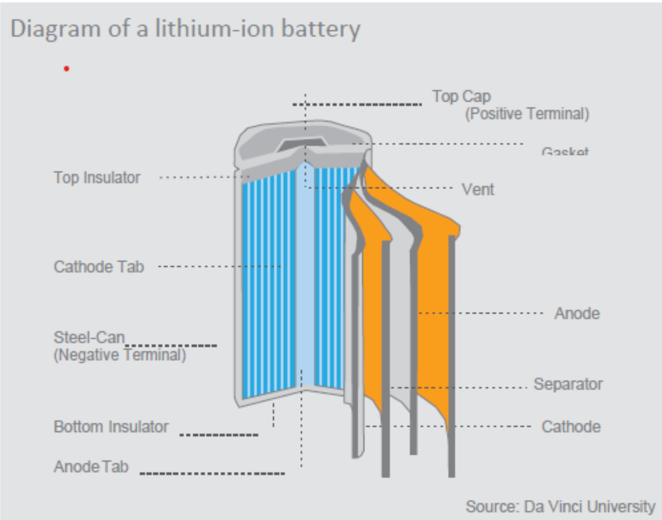
7.4.2 BESS TECHNOLOGY CONSIDERED

Typically, a BESS consist of multiple battery cells that are assembled together to form modules. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. The preferred location of the BESS has been considered and assessed by the specialists, and the ancillary (or associated) infrastructure will include (but not limited to):

- a battery room;
- inverters;
- switch gear room; and
- Supervisory Control and Data Acquisition (SCADA) equipment.

Preferred Technology - Lithium ion (Li-ion) batteries are the most common stationary battery in the market today. Simply put, the batteries consist of a graphite electrode and a lithium-based electrode immersed in a liquid. When the battery is in use, charged lithium atoms ions flow from the graphite electrode to the lithium-based electrode through the liquid, and that flow of charged particles is what generates electricity. When the battery is recharged the flow is reversed, sending the lithium ions back to the graphite anode where they are stored ready for discharge.

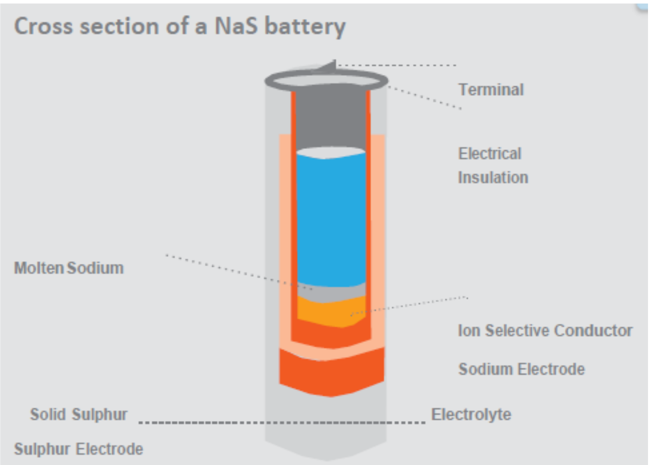
FIGURE 7-1 DIAGRAM OF LITHIUM-ION BATTERY



Solid State Battery is an acceptable solution to assist with reducing the fire risk Li-ion batteries pose. Unlike Li-Ion Batteries, Solid State Batteries have an ionic liquid made up of non-flammable molten salts with low melting points i.e. the electrolyte is considered a solid. Compared to Li-ion batteries with liquid electrolytes, SSBs offer an attractive option owing to their potential in improving safety and achieving both higher power and high energy densities. The trade-off with this type of battery is that electrically charged atoms do not move as freely and easily through a solid as they do through a liquid, so thus making them less efficient at generating electricity.

A sodium sulphur (NaS) battery is a molten state battery constructed from sodium (Na) and sulphur (S). The battery casing is the positive electrode while the molten core is the negative electrode. The battery operates at high temperatures of between 300-350 degrees Celsius (°C), while lower temperature versions are under development. In charging, the sodium ions are transported through the ion selective conductor to the anode reservoir. Discharge is the reverse of this process. Since sodium ions move easily across the ion selective conductor, electrons cannot, therefore there is no self-discharge. When not in use the batteries are typically left under charge so that they will remain molten and be ready for use when needed. If shut down and allowed to solidify, a reheating process is initiated before the batteries can be used again.

FIGURE 7-2 DIAGRAM OF A SODIUM-SULPHUR BATTERY



Flow Batteries consist of two tanks of liquids that feed into electrochemical cells. The main difference between flow and conventional batteries is that flow batteries store the electricity in the liquid rather than in the electrodes. They're far more stable than Li-ion, they have longer lifespans, and the liquids are less flammable. Not only that, but a flow battery can be scaled up by simply building bigger tanks for the liquids. The most widely known and used flow battery is vanadium flow battery.

Table 7-1 describes the most widely used technologies available in the market, and the most feasible technology for large utilities projects. It must be noted that the technology is constantly changing and evolving and as such the Applicant would utilise the best possible technology available at the time of placement.

TABLE 7-1 THE TECHNOLOGY OPTIONS FOR THE BESS

Activity Alternative	Advantage	Disadvantage
Preferred Technology: **Li-Ion Batteries**[42]	• Lithium ion has the smallest installation footprint when compared to the technologies for the similar energy capacity.	• Negative effects of overcharging / over discharging. • Volatility leading to Fire and Explosions.

[42]Li-Ion Battery: https://ensia.com/features/battery-innovations-renewable-energy/

Activity Alternative	Advantage	Disadvantage
	• Li-ion batteries are able to tolerate more discharge cycles than other technologies. • High efficiency. • Produce the highest voltage compared to other batteries by driving high electron flow.	• Potential for issues associated with overheating (Certain Lithium chemistry's). • The Lithium element in this technology is considered hazardous / dangerous goods. • Lithium is a finite resource with concerns of its availability in the long term.
Solid State Battery[43]	• Potential to substitute Lithium for another electrode material. • Marked improvement in safety at cell and battery levels: solid electrolytes are non-flammable when heated, unlike their liquid counterparts. • It permits the use of innovative, high-voltage high-capacity materials, enabling denser, lighter batteries with better shelf-life as a result of reduced self-discharge. • Simplified mechanics as well as thermal and safety management.	• Reduced conductivity. • Sourcing of a suitable electrolyte. • Not as well researched and widely accepted as Li-Ion batteries. • Narrow temperature range and cannot tolerate varying temperature.
NaS Batteries[44]	• Long life cycle. • Able to tolerate a high number of charge/discharge cycles. • ability to discharge fully with no effects to the performance.	• Low energy to size ratio. • Heating may be required. • Potential safety issues with the molten sodium. • Has the potential to catch on fire.
Flow Batteries[45]	• More stable than Li-Ion battery. • Are known to have the longest lifespan. • Less flammable liquids. • Technology is scalable for large grid infrastructure and renewable energy project.	• The liquids can be costly, so there's a greater up-front cost for the batteries. • Not as efficient as Li-Ion Battery.

7.5 TECHNOLOGY ALTERNATIVES

Alternative renewable energy technologies include hydro-electric power, photovoltaic solar or concentrated solar power. The site itself has no resource for hydro-electricity and a solar electricity generation would require a much greater infrastructure footprint and water consumption (for cleaning panels) to generate the equivalent energy of the proposed WEF. The

[43] Solid State Battery: https://www.greentechmedia.com/articles/read/us-storage-companies-quietly-grow-bets-on-solid-state-batteries
[44] Li-Ion Battery and Na-S Battery: https://ensia.com/features/battery-innovations-renewable-energy/
[45] Flow Battery: https://newatlas.com/energy/iron-aqds-flow-battery-usc/

question if wind energy technology is the best technology for the proposed location was answered as part of the Need and Desirability assessment (Section 5).

Wind energy presents less of an impact on the continued use of the land for grazing, as it does not result in the shading that occurs from solar facilities which affects vegetation and consequently farming practices. Whilst there are potential impacts associated with wind energy which are not associated with solar, such as collision risk with avifauna, there are different potential impacts for solar facilities such as loss of habitat and foraging areas for avifauna and other ecological receptors.

Based on the site's physical characteristics and existing land uses, the wind energy technology is best suited to the site.

8. THE PREFERRED ALTERNATIVE

The Hugo WEF is located near De Doorns within the Breede Valley Local Municipality in the Western Cape Province.

The proposed Hugo WEF project site is proposed to accommodate infrastructure (as detailed below), which will enable the wind farm to supply a contracted capacity of up to 336 MW. The development footprint of the site will be up to 100 ha, dependent on the sensitivities in the area. The proposed development will comprise of the following infrastructure:

Hugo WEF components:

- Up to 42 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 8 MW.
- A transformer at the base of each turbine.
- Concrete turbine foundations - approximately up to 1,000 m^2 per turbine.
- Each turbine will have a hardstand of approximately up to 7,500m^2 per turbine.
- Temporary laydown areas (with a footprint of up to 9 ha), which will accommodate the boom erection, storage and assembly area.
- BESS (with a footprint of up to approximately 5 ha).
- Cabling between the turbines, to be laid underground where practical.
- One on-site substation 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 6 m 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.

8.1 WIND ENERGY FACILITY COMPONENTS

The WEF will comprise components described below. 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.

8.1.1 WIND TURBINE GENERATORS AND HARDSTAND AREAS

The proposed Hugo WEF will comprise up to 42 turbines (each turbine with an approximate capacity of 8 MW) with a maximum combined output capacity of up to 336 MW with an anticipated lifespan of 20-25 years.

The turbines will be three-bladed horizontal-axis design with a 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 development footprint and associated facility infrastructure will cover an area of up to 100 ha depending on the final design. The aerial extent of the total area is 7,900 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 been finalised and confirmed during the EIA process, following the assessment of technical and environmental constraints. Figure 8-1 to

Figure 8-4 ILLUSTRATION OF A TYPICAL TURBINE HARDSTAND AND LAYDOWN AREA

indicate a typical wind energy operation sequence as well as the different components of a wind turbine.

FIGURE 8-1 AN ILLUSTRATION OF TYPICAL COMPONENTS OF A WTG

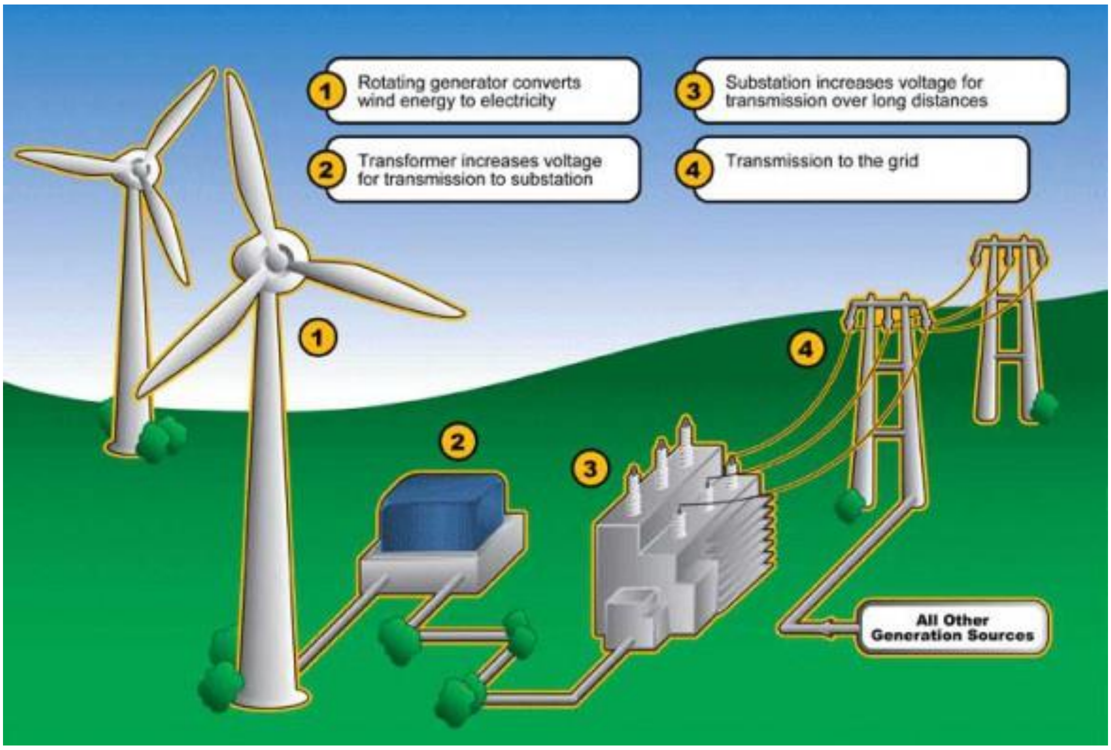


FIGURE 8-2 THE INSIDE OPERATION OF A TYPICAL WIND TURBINE

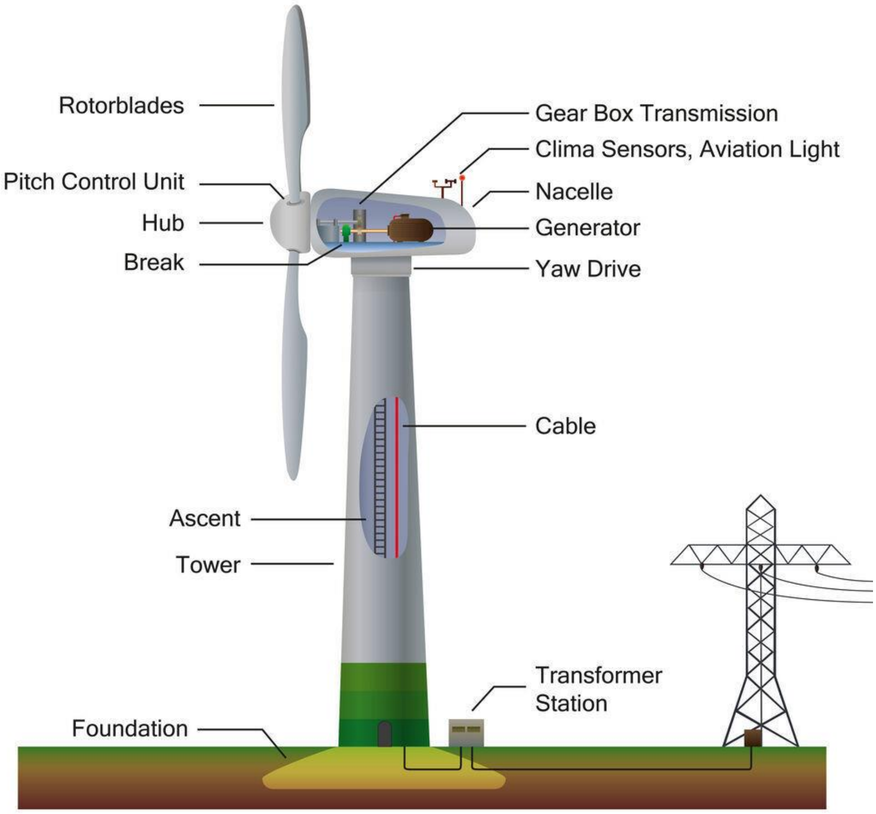


FIGURE 8-3 THE INSIDE OPERATION OF A TYPICAL WIND TURBINE

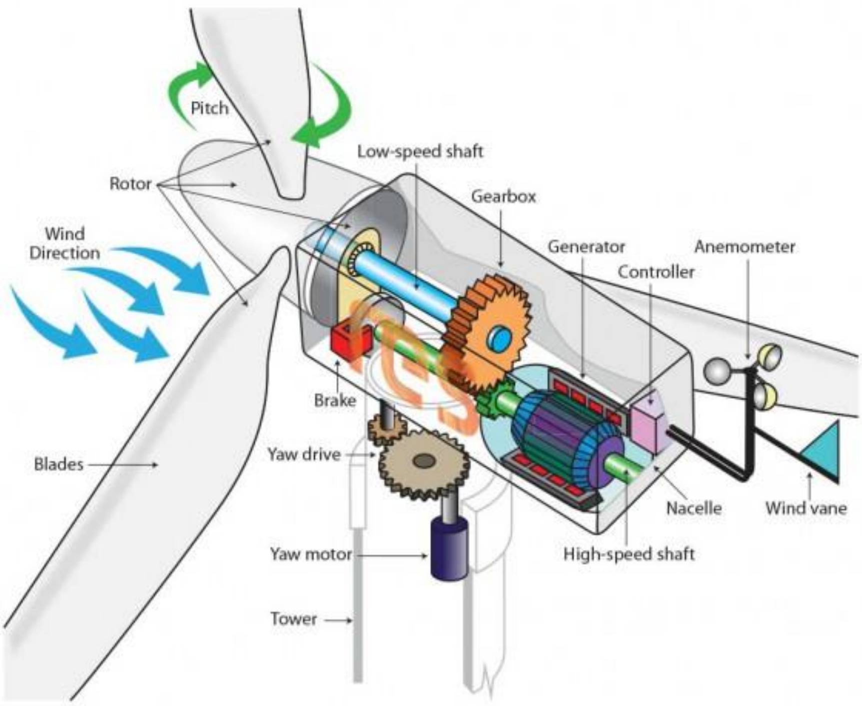


FIGURE 8-4 ILLUSTRATION OF A TYPICAL TURBINE HARDSTAND AND LAYDOWN AREA

8.1.2 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 up to 33kV.

8.1.3 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 Hugo 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 bunded 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 10 m.

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 near 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 8-5 TYPICAL REPRESENTATION OF HOW BATTERIES AND BATTERY MODULES ARE HOUSED AND ASSEMBLED

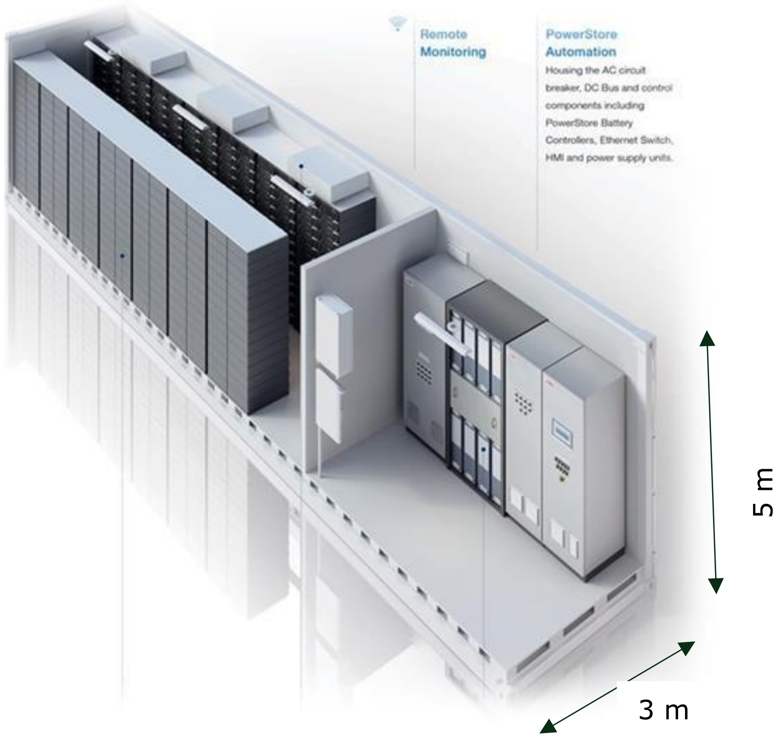


FIGURE 8-6 SOLARCITY'S TESLA BATTERY STORAGE FACILITY, HAWAII

FIGURE 8-7 A STOCK IMAGE OF A SIMILAR DEVELOPMENT WITH AN ON-SITE SUBSTATION AND BESS

8.1.4 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.

8.1.5 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.

8.2 SERVICE PROVISION

8.2.1 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.

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.

8.2.2 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 licensed borehole (if feasible) 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 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.

8.2.3 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 wastewater will be handled in accordance with the Guidelines for the Utilisation and Disposal of Wastewater Sludge Volumes 1 to 6 (Herselmann & Snyman, 2006).

A project specific stormwater management plan will need to be produced and appended to the EMPr (Appendix B) for implementation.

8.2.4 WASTE MANAGEMENT

During the construction phase, it is estimated that the Hugo 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.

The development of the wind energy facility 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.

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.

8.2.5 SEWAGE

The Wind Energy Facility 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 Applicant may consider a conservancy tank or Maskam fusion system, which will be employed on site during the operational phase for which a registered company will be contracted to store and transport sewage from site to an appropriate municipal wastewater treatment facility.

8.2.6 ELECTRICITY

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

8.3 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.

8.4 SUMMARY OF PROJECT INFORMATION

WEF Technical Details

WEF Technical Details Components	**Description/Dimensions - Hugo**
Maximum Generation Capacity	Up to 336 MW
Turbine Capacity	Up to 8 MW
Type of technology	Onshore Wind
Number of Turbines	Up to 42
WTG Hub Height from ground level	Up to 150 m
Blade Length	Up to 100 m
Rotor Diameter	Up to 200 m
Structure height (Tip Height)	Up to 250 m
Structure orientation	Wind regime dependent
Area occupied by both permanent and construction laydown areas	• Concrete turbine foundations - approximately up to 1,000 m^2 per turbine; • Each turbine will have a hardstand area of approximately up to 7,500 m^2 per turbine; • Temporary laydown areas (with a combined footprint of up to 9 ha) which will accommodate the boom erection, storage and assembly area; and • A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha).
O&M building with parking area	Up to 1 ha
Site Access	Via the R318

WEF Technical Details Components	Description/Dimensions - Hugo
Area occupied by inverter transformer stations/substations	Up to 2.5 ha
Capacity of on-site substation	132/33 kV
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 m

9. PUBLIC PARTICIPATION PROCESS

9.1 INITIAL PROCESS

The first stage of public consultation was undertaken during the initial notification phase prior to the completion and public review of the Draft Scoping Report. On the 14 December 2023, advertisements were placed in one provincial newspaper (The Daily Voice) and one local newspaper (Standard Breederivier Gazzette); site notices were erected on the site; and written notices were sent out to the affected landowners, surrounding landowners and occupiers of the site, as well as to key stakeholders and organ of state. The objective of this phase was to inform the National, Provincial and Local Government Authorities, relevant public, private sector entities, NGOs and local communities about the project and capture their initial views and issues of concern that is important for the formulation of a plan of study and to allow the public to register as I&APs. Following the initial phase, notification letters were sent to all I&APs informing them of the availability of the draft scoping report for public review and comment, which took place for a period of 30-days from the Thursday, 29 February 2024 to Tuesday, 02 April 2024 (both days inclusive).

Volume III contains the Public Participation Report, which expands on the PPP conducted to date.

The primary aims of the public participation process (PPP) are:

- To inform I&APs of the proposed development;
- To identify issues, comments and concerns as raised by I&APs;
- To promote transparency and an understanding of the project and its potential consequences;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed development; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in the comments and responses report.

9.2 EIA PHASE PUBLIC PARTICIPATION

During the Draft EIA phase the following tasks were undertaken for public participation:

- Notification letters were sent out to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the Draft Environmental Impact Assessment Report (DEIAR) for review and comment (30 days);
- The Comments and Reponses Report was updated, recording comments and/or queries received and the responses provided;
- Notification letters to all registered I&APs, key stakeholders, and organs of state to inform them of the decision by the DFFE and the appeal procedure; and

Furthermore, I&APs were also able to register on the I&AP database throughout the duration of the EIA process and registered I&APs will be informed about the progress of the application.

The public participation in the EIA phase has the following objectives:

- Inform I&APs about the EIA process followed to date;

- Present the specialist studies undertaken, impacts and proposed mitigation measures;
- Present the results of the Environmental Impact Assessment; and
- Collect concerns and expectations and take them into consideration in the EIA.

Details of the above information is attached in a public participation report (Volume III).

9.3 SUMMARY OF COMMENTS

9.3.1 INITIAL SCOPING PHASE

During the initial notification phase, no comments / queries / questions / concerns were received from I&APs.

9.3.2 SCOPING PHASE

During the scoping phase comment was received from the DFFE, other authority and I&APs. Responses to comments received are provided in Section 5 of the PP Report (Volume III), with EAP / specialist / applicant responses, and the original comment and responses has been appended to the PP report (Appendix F).

9.3.3 EIA PHASE

During the EIA phase comment was received from the DFFE, other authority and I&APs. Responses to comments received are provided in Section 5 of the PP Report (Volume III), with EAP / specialist / applicant responses, and the original comment and responses has been appended to the PP report (Appendix F).

10. ASSESSMENT OF POTENTIAL IMPACTS

This section evaluates the impacts associated with the construction, operational, decommissioning and cumulative phases of the WEF.

10.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

It should be noted that an Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables.

An agricultural impact is a change to the future agricultural production potential of land. In most developments, including the one being assessed here, 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 an agricultural 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; and
- 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 wind energy facilities, for which I have recently done assessments, 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 wind farms 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 site that incudes croplands. 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, it is highly unlikely that this has caused a reduction in agricultural production. Tiny amounts of cropland 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; and
- Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.

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; and
- 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.

Due to the facts that the energy facility will exclude only an insignificantly small area of agricultural production from the land and that its negative impact is offset by economic 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.

10.1.1 MITIGATION MEASURES

Generic mitigation measures that are effective in preventing soil degradation are all inherent in the engineering of such a project and/or are standard, best-practice for construction sites.

- A system of storm water management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there. As part of the system, the integrity of the existing contour bank systems of erosion control on croplands, where they occur on steeper slopes, must be kept intact.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 25 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-

filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Across most of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire cut surface.

Furthermore, there are no areas to be avoided in terms of agricultural impacts and no buffers are applicable.

10.2 FRESHWATER AND WETLANDS (AQUATICS)

It was determined that the impacts upon aquatic biodiversity associated with the project are of Low significance, after mitigation. This assumes that the mitigations listed below are considered coupled to the fact that the overall layouts have avoid any of the High / No-Go areas, unless making use of areas with impacts such as existing farm roads which has taken place, however it is assumed that the final layout will orientate the hardstands, crane pads, blade laydowns and construction camps outside of any of the No-Go areas.

The loss of irreplaceable aquatic habitat and/or important aquatic obligate biota is therefore highly unlikely. The impacts are easily mitigated (provided the mitigation measures and monitoring plan within the EMPr and this report are implemented and adhered to during all phases of the project).

The following construction and decommissioning potential impacts were assessed with regard aquatic environment that would be affected by the proposed development:

- Impact 1: Loss of habitat containing protected species or Species of Special Concern and / or habitats that could contain species listed as Critically Endangered, Endangered or Vulnerable
- Impact 2: Loss of any critical ecological corridors and the connectivity of habitats which are linked to future conservation plans or protected areas expansion and NFEPAs, associated within any riverine or wetland systems.
- Impact 3: Potential spread of alien vegetation
- Impact 4: Loss of riparian habitat
- Impact 5: Changes to the hydrological regime and increased potential for erosion
- Impact 6: Changes to water quality

10.2.1 CONSTRUCTION, OPERATION AND DECOMMISSIONING PHASE

Impact Phase: Construction and Decommissioning
Nature of the impact: Loss of vegetation and in particular species / habitats that could contain listed as Critically Endangered and or Vulnerable species (direct)
Description of Impact: Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones. Loss can also include a functional loss, through change in vegetation type via alien encroachment, reducing aquatic biodiversity. However no aquatic vegetation or fauna with conservation concern were observed during this assessment, coupled to the fact that any sensitive areas will be avoided.

Impact Phase: Construction and Decommissioning

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	Without Mitigation			With Mitigation	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	

Was public comment received? No

Has public comment been included in mitigation measures? No

Mitigation measures to reduce residual risk or enhance opportunities:

- The development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout prior to construction.
- Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.
- Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).

To minimise the impact of the access roads:

- Use existing roads or upgrade existing tracks rather than constructing entirely new roads wherever possible and has been included in the proposed layout.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly before any construction commences.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- Where required, all pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that head cut erosion does not develop because of the gradient change from the natural ground level to the invert level of the culvert.
- The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist, with a preference for low level drifts where possible.
- Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from obstruction activities.
- Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.
- All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated.

It is the contractor’s responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.

Impact Phase: Construction and Decommissioning

Nature of the impact: Loss of any critical corridors and connect habitats that are linked to any future conservation plans or protected areas expansion (direct) is not expected as these have been avoided, coupled to the fact that hydrological connections will be retained through avoidance or the inclusion of ecological buffers.

Description of Impact: Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones and have been included in any Critical Biodiversity Areas.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	Without Mitigation			With Mitigation	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	

Was public comment received? No

Has public comment been included in mitigation measures? No

Mitigation measures to reduce residual risk or enhance opportunities:

- The aquatic systems have been mapped to a finer scale and have taken cognizance of any potential CBAs. As High / No-Go have been avoided by the major infrastructure such as turbines and buildings, the aquatic zones associated within the CBA / ESAs have also been avoided. Roads will need to traverse these areas, thus it is important to try and select existing areas with impacts / crossings where possible
- The development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout prior to construction. Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).

To minimise the impact of the access roads:

- Use existing roads or upgrade existing tracks rather than constructing entirely new roads wherever possible and has been included in the proposed layout.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- Where required, all pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to

Impact Phase: Construction and Decommissioning	
ensure that head cut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert. • The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist, with a preference for low level drifts where possible. • Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.cAll disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.	
Residual impact	Very low and acceptable with adoption of mitigation measures

Impact Phase: Construction and Operation					
Nature of the impact: Any physical disturbance could result in the spread of alien vegetation (direct)					
Description of Impact: During construction, complete clearing of the roads and turbine areas, as well any ancillary structures (offices and substations) will be required. This disturbance then allows for the alien species to colonise the soils, if left unmanaged.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (39)		Low Negative Impact (14)		
Was public comment received? No					
Has public comment been included in mitigation measures? No					

Impact Phase: Construction and Operation	
Mitigation measures to reduce residual risk or enhance opportunities: • Alien vegetation management must be initiated at the beginning of the construction period and must extend into any remaining areas into the operation phase on the facility • The revegetation of any temporary sites as well as any previously degraded areas must begin from the onset of the project, with the involvement of a botanist to assist with the revegetation specifications Regeneration of alien vegetation must be monitored once all areas have been cleared, forming part of a long-term alien vegetation management plan	
Residual impact	Very low and acceptable, with adoption of mitigation measures and monitoring

Impact Phase: Construction and Decommissioning					
Nature of the impact: It was recommended that all wetlands / riverine systems as well as the inclusive of buffers, be avoided. This was then taken forward in the design process.					
Description of Impact: During construction, complete clearing of the roads and turbine areas, as well any ancillary structures (offices and substations) will be required, which may impact the aquatic function or any corridors or connections between aquatic systems. However, all Very High Sensitivity / No-Go areas have been avoided by the proposed layout by also making use of existing road crossings or considering any of the proposed buffers.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	
Was public comment received? No					
Has public comment been included in mitigation measures? No					
Mitigation measures to reduce residual risk or enhance opportunities: • Same mitigation measures as Loss of vegetation					
Residual impact	Very low and acceptable with adoption of mitigation measures				

Impact Phase: Construction and Decommissioning					
Nature of the impact: Increased hard surfaces can result in increases in runoff generated by the site, thereby resulting in changes to localised hydrological regimes.					
Description of Impact: During construction, complete clearing of the roads and turbine areas, as well any ancillary structures (offices and substations) will be required, which may impact the aquatic function or any corridors or connections between aquatic systems. However, these areas have all been avoided by the proposed layout by also making use of existing road crossings or by considering any of the proposed buffers.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	
Was public comment received? No					
Has public comment been included in mitigation measures? No					

Mitigation measures to reduce residual risk or enhance opportunities:

- No stormwater discharged may be directed to delineated aquatic zones or the associated buffers.
- A stormwater management plan finalised prior to construction, detailing the structures and actions that must be installed to prevent the increase of surface water flows directly into any natural systems.
- Effective stormwater management must include measures to slow, spread and deplete the energy of concentrated flows thorough effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed areas

To minimise the impact of the access roads:

- Use existing roads or upgrade existing tracks rather than constructing entirely new roads wherever possible and has been included in the proposed layout.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- Where required, all pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that head cut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert.
- The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist, with a preference for low level drifts where possible.

Impact Phase: Construction and Decommissioning	
• Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. • Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted. • All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.	
Residual impact	Very low and acceptable with adoption of mitigation measures

Impact Phase: Construction and Decommissioning					
Nature of the impact: Potential impact on localised surface water quality (indirect)					
Description of Impact: During construction or decommissioning, earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. This can result in possible deterioration in aquatic ecosystem integrity and species diversity.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	
Was public comment received? Not yet					
Has public comment been included in mitigation measures? No					
Mitigation measures to reduce residual risk or enhance opportunities:					

Impact Phase: Construction and Decommissioning	
• All liquid chemicals including fuels and oil, including for the BESS, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refueled or serviced within 100m of a river channel or wetland. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be beyond any demarcated water courses and their respective buffers. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course. • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. ECO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur, are quickly rectified.	
Residual impact	Low risk and acceptable, with adoption of mitigation measures and monitoring

10.3 TERRESTRIAL BIODIVERSITY

10.3.1 CONSTRUCTION AND DECOMMISSIONING PHASE

The impacts that will be most prevalent during the Construction Phase of the proposed Hugo WEF are:

- Vegetation Clearing
- Chemical Contamination
- Reduced Connectivity and Restricted Movement
- Altered Flow Regimes
- Enhancement of Overgrazing
- Disturbance and/or Displacement
- Mortality

Impact Phase: Construction/ Decommissioning					
Nature of the impact: Potential vegetation clearing impacts associated with the construction and decommissioning phase of the proposed development					
Description of Impact: Certain areas will need to be cleared of vegetation to facilitate construction of associated infrastructure and transport of personnel on site. This impact can negatively affect endemic, threatened or important flora species					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability

Impact Phase: Construction/ Decommissioning					
Without Mitigation	Local	Medium Term	Recoverable	Moderate	Highly Probable
Score	2	3	3	3	4
With Mitigation	Site	Short Term	Recoverable	Low	Probable
Score	1	2	3	2	3
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	Moderate Negative Impact (44)		Low Negative Impact (24)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- The development footprint must avoid No-Go/ High Sensitivity areas as much as possible.
- Limit the area of impact as much as possible.
- A pre-construction walkthrough during the optimal flowering period (spring) of the finalized development layout must be conducted to ensure that No-Go and High Sensitivity areas are avoided where possible.
- Ensure that lay-down and other temporary infrastructure are within Low Sensitivity areas.
- Rehabilitate disturbed areas that are not required by the operational phase of the development.
- All construction staff on site must attend an environmental induction to ensure that basic environmental principles are adhered to. This includes topics such as avoiding fire hazards, no littering, appropriate handling of pollution and chemical spills, minimizing wildlife interactions, remaining within demarcated construction areas, avoidance of No-Go areas and sensitive habitats etc.
- Demarcate sensitive areas near the development footprint as no-go areas with construction tape or similar and clearly marked as No-Go areas.
- An EMPr must be implemented and must provide a detailed description of how construction activities must be conducted to reduce unnecessary clearing and/or destruction of habitat.

Residual impact	Residual impacts are expected to occur for the area and may be relevant in soil erosion and alien invasive species establishing themselves before natural flora can. All mitigation measures would need to be adhered to and continuous monitoring and maintenance is required after construction.

Impact Phase: Construction

Nature of the impact: Potential chemical contamination impacts associated with the construction phase of the proposed development.

Description of Impact: Chemical contamination during the Construction phase. Spillage of construction materials or chemicals can adversely impact waterbodies and the fauna and flora on which they depend.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	High	Highly Probable

Impact Phase: Construction					
Score	2	3	3	4	4
With Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	Moderate Negative Impact (48)		Low Negative Impact (27)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- The development footprint must avoid High Sensitivity areas as much as possible.
- Ensure proper storage and handling of chemicals (fuel, lubricants, cleaning agents) used on-site. Store all chemicals in designated areas equipped with spill containment measures to prevent leaks and spills.
- A chemical spill response plan must be developed before construction activities are undertaken. This spill response plan must be implemented by an ECO on site.
- Provide appropriate training to construction staff on the safe handling of chemical and hazardous materials.
- Implement measures to prevent runoff to nearby waterbodies by installing sediment traps and/or containment pods. This should be addressed in the Stormwater Assessment.

Residual impact	Residual impacts are expected to occur for the area and may be relevant in aquatic systems on site as well as soil cover. The use of chemicals on site should be limited as far as possible and environmentally friendly alternatives should be utilized, resulting in no major residual impacts associated with the phase.

Impact Phase: Construction/ Decommissioning

Nature of the impact: Reduced connectivity and restricted movement of fauna impacts associated with the construction and decommissioning phase of the proposed development.

Description of Impact: Construction and Decommissioning activities and novel infrastructure (e.g., perimeter fencing) may exclude species from portions of suitable habitat by restricting animals' movement across the landscape.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	Moderate	Highly Probable
Score	2	3	3	3	4
With Mitigation	Site	Short Term	Recoverable	Low	Probable
Score	1	2	3	2	3
Significance Calculation	Without Mitigation		With Mitigation		

Impact Phase: Construction/ Decommissioning		
S=(E+D+R+M)*P	Moderate Negative Impact (44)	Low Negative Impact (24)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation measures to reduce residual risk or enhance opportunities:

- Minimization of length and width of road network.
- Fencing and road designs to allow for passage of animals (e.g., short, wide culverts in roads and wildlife friendly fencing).
- Implement habitat enhancement and restoration measures to offset the loss of connectivity caused by construction and decommissioning activities. This can be achieved by planting native vegetation, installing nesting boxes, or creating artificial shelters to provide alternative habitats for displaced fauna species and enhance connectivity within the landscape. This should be considered in the EMPr.
- All recommendations in the Terrestrial Animal Specialist Assessment must be adhered to.

Residual impact	Residual impacts are expected to occur for the area specifically for wildlife. Change in wildlife behaviour as a response to activities associated with the WEF is expected and should be continuously monitored.

Impact Phase: Construction

Nature of the impact: Potential altered flow regime impacts associated with the construction phase of the proposed development.

Description of Impact: 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 over time.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	High	Highly Probable
Score	2	3	3	4	4
With Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
Significance Calculation	Without Mitigation			With Mitigation	
S=(E+D+R+M)*P	Moderate Negative Impact (48)			Low Negative Impact (27)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

Impact Phase: Construction

- Adequate flow and erosion control measures should be included in the EMPr.
- Ongoing monitoring and rehabilitation of disturbed areas must be implemented.
- All recommendations in the Stormwater Assessment must be strictly adhered to.

Residual impact	Vegetation clearing may impact runoff and infiltration rates. As a result, residual impacts may occur after mitigation measures have been applied, but these impacts are manageable.

Impact Phase: Construction

Nature of the impact: Overgrazing impacts associated with the construction phase of the proposed development.

Description of Impact: During the construction phase of the project, livestock are expected to be displaced and disturbed through activities that relate to removal of fences and access gates being left open by personnel. The construction of the WEF may reduce available grazing land and cause livestock to potentially overgraze on other natural areas, causing habitat fragmentation and wildlife restriction to loss of flora SCC and compaction. However, there is scope to reduce the anticipated negative impact of potential overgrazing during the construction phase of the development and turn it into a positive impact. Developers can work closely with landowners to minimize the impacts of overgrazing. Farmers can reduce the number of livestock on the farm, which will be compensated during the operational phase of the WEF. Developers can enforce restoration rehabilitation of natural land throughout the PAOI, thus creating opportunities to enhance the local biodiversity within the area. Post-mitigation significance is anticipated to be positive, provided mitigation measures are implemented during the construction phase of the development.

Impact Status: Positive

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	High	Probable
Score	2	3	3	4	3
With Mitigation	Local	Short Term	Recoverable	Low	Low Probability
Score	2	2	3	2	2
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	Moderate Negative Impact (36)		Low Positive Impact (16)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Temporary laydown areas, construction yards and site office buildings to be placed in low sensitivity areas.
- Developer should work closely with the farmer to identify areas that should be left for livestock grazing. These areas should be of an adequate size and should accommodate all livestock.
- Developer to work with livestock farmers to reduce number of stock prior to construction to avoid the displacement of sheep during construction. The loss of income from livestock farming should be compensated by the developer.

Impact Phase: Construction	
• Modified areas to be rehabilitated as far as possible through a restoration and rehabilitation plan. • Disturbed areas from construction activities should be rehabilitated and treated in conjunction with an Alien Invasive Management Plan to reduce encroachment of invasive species.	
Residual impact	Residual impacts include altered vegetation composition despite various rehabilitation plans. Long-term challenges may also arise in restoration plans as modified habitats may be challenging to restore fully to natural states. Farmers will also suffer loss from livestock farming before being compensating by the development.

Impact Phase: Construction/ Decommissioning					
Nature of the impact: Potential disturbance and/or displacement impacts on local wildlife associated with the construction and decommissioning phase of the proposed development.					
Description of Impact: Increased activity, movement of machinery and operation of equipment may disturb and/or displace certain animal SCCs from the vicinity of construction and decommissioning.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Medium term	Recoverable	High	Highly Probable
Score	3	3	3	4	4
With Mitigation	Local	Short Term	Recoverable	Moderate	Probable
Score	2	2	3	3	3
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	Moderate Negative Impact (52)		Low Negative Impact (30)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Temporary laydown areas, construction yards and site office buildings to be placed in low sensitivity or modified areas. • Pre-construction baseline animal monitoring programme must be implemented, with focus on areas identified for the construction footprint during the design phase (e.g., road network). • Avoidance of highly sensitive habitats for construction areas. • Clearly demarcated construction areas and no unauthorized personnel to be permitted beyond demarcated areas. • Adequate noise reduction measures (where possible) on heavy machinery. • Minimize construction activity that occurs between dusk and dawn when animals are most active. • Minimization of lighting used to illuminate construction areas and site buildings.					

Impact Phase: Construction/ Decommissioning	
Residual impact	Residual impacts include displaced SCCs as a result of activities associated with the WEF.

Impact Phase: Construction/ Decommissioning

Nature of the impact: Potential mortality of faunal and flora species due to direct and indirect impacts associated with the construction and decommissioning phase of the proposed development.

Description of Impact: Direct mortality due to increased traffic and illegal collection/poaching/entrapment, and indirect mortality due to potential increased predator presence and decreased detection can occur during the Construction/Decommissioning Phase.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	Very High	Highly Probably
Score	2	4	5	5	4
With Mitigation	Site	Medium term	Recoverable	moderate	Probable
Score	1	3	3	3	3
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	High Negative Impact (64)		Low Negative Impact (30)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- No movement of construction vehicles and personnel between dusk and dawn.
- Implementation and enforcement of speed limits.
- Roadkill monitoring and recording programme.
- Induction toolbox talks to personnel to increase awareness about animal SCCs present and roadkill risks.
- No unauthorized movement of personnel.
- No unauthorized access to the construction site.
- No trenches to be left uncovered overnight.
- Trenches, excavations and cattle grids to have slopes to allow for animals to escape should they fall in.
- No hunting permitted.
- No dogs or cats permitted (other than those of the landowner).
- Waste management programme to prevent trash buildup attracting species such as crows.
- Roadkill to be immediately reported, removed and suitably disposed of to prevent scavenging (e.g., buried).

Residual impact	Residual impacts include direct mortality of species of conservation concern as a result of activities associated with the WEF.

10.3.2 OPERATIONAL PHASE

The anticipated impacts for the operational phase of the proposed development are:

- Habitat Fragmentation
- Potential Encroachment of Alien Invasive Species
- Light, Noise and Visual Pollution
- Faunal Mortality and Loss of SCC
- Soil erosion
- Unwanted Fires

Their significance with and without the recommended mitigation measures are assessed in the tables below

Impact Phase: Operation					
Nature of the impact: Potential habitat fragmentation impacts associated with the operational phase of the proposed development.					
Description of Impact: Habitat fragmentation due to the presence of wind turbines and associated infrastructure is anticipated for the operational phase. Fragmented habitats may cause ecological barriers and restricted gene flow, indirectly affecting faunal and flora species.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	High	Highly Probably
Score	2	4	3	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Probable
Score	1	3	3	3	3
Significance Calculation	Without Mitigation		With Mitigation		
S=(E+D+R+M)*P	Moderate Negative Impact (52)		Low Negative Impact (30)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- The EMPr should include biodiversity monitoring and an adaptive management plan for the operational phase to ensure there are no adverse impacts observed to the fauna community.
- Biodiversity monitoring must be implemented for various specialisms to assess the ongoing impacts of the operational wind farm compared to pre-construction baseline data. Specialists would need to be contracted by the Functional Entity and monitoring must come into effect in direct alignment with various specialist Guidelines and Best Practice.
- Implement habitat enhancement and restoration measures to offset the loss of connectivity caused by operational activities. This can be achieved by planting native vegetation, installing nesting boxes, or creating artificial shelters to provide alternative habitats for displaced fauna species and enhance connectivity within the landscape. This should be considered in the EMPr.

Impact Phase: Operation	
• All recommendations in the Terrestrial Animal Specialist Assessment must be adhered to.	
Residual impact	Residual impacts include displacement of species, potentially species of conservation concern, from the site.

Impact Phase: Operation					
Nature of the impact: Potential encroachment of alien invasive species resulting in loss of flora SCC associated with the operational phase of the proposed development.					
Description of Impact: Movement of personnel, and increased disturbance puts the proposed development area at greater risk of alien invasive species moving into and spreading within the area. Alien invasive species will encroach into disturbed areas left behind by construction activities and may go undetected during the operational phase. This impact results in the potential loss of flora SCC or endemic species.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Definite
Score	2	4	5	5	5
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (80)		Low Negative Impact (20)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread. • Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible. • The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with the alien eradication programme in the EMPr to reduce unintended ecological impacts.					
Residual impact	Residual impacts include loss of natural flora and suitable habitat due to encroachment of alien invasive species.				

Impact Phase: Operation

Nature of the impact: Potential light, noise and visual pollution impacts associated with the operational phase of the proposed development.

Description of Impact: Wind farms have the potential to directly impact species through noise and vibration, light, and visual pollution. Visual disturbance caused by wind turbines and associated infrastructure can impact faunal species' sight and deter their navigation and mating cues.
Artificial light present at night from operational turbines may attract insects and also attract bats posing a collision risk. The WEF's associated infrastructure will cause noise and vibrations throughout the site and adjacent areas. This may impact faunal species by affecting their behaviour and deter species from their natural habitat.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	High	Highly Probably
Score	2	4	3	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Probable
Score	1	3	3	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (52)			Low Negative Impact (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Use low-intensity and downward-facing lighting fixtures to reduce the attraction of insects and mitigate the risk of bat collisions.
- Employ noise mitigation measures, such as acoustic insulation, to reduce the transmission of noise from wind turbines and associated infrastructure.
- Develop and implement operational protocols to minimize noise and vibration disturbances during critical periods for faunal species, such as breeding, nesting, and foraging.
- Schedule maintenance activities and construction work during off-peak hours to minimize disruption to wildlife behavior and habitat use.

Residual impact	Residual impacts include potential collision risks of SCC by potentially attracting them into the rotor swept area. Other residual impacts include loss of species abundance and diversity from the area due to the WEF and associated activities.

Impact Phase: Operation

Nature of the impact: Potential fire impacts associated with the operational phase of the proposed development.

Description of Impact: Increased personnel on site increases the fire risk due to smoking and/or use of electrical equipment on site.

Impact Status: Negative

Impact Phase: Operation					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probably
Score	2	4	5	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Probable
Score	1	3	3	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Low Negative Impact (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- No open fires should be permitted outside of designated areas.
- Smoking areas must be defined, and no smoking should be permitted outside of designated areas.
- An emergency response plan for uncontrolled fires must be in place prior to operation and implemented for the duration of the WEF's lifespan.
- All staff members must have a Fire and Safety induction to increase awareness.

Residual impact	Residual impacts include loss of faunal SCC. This is why it is critical to manage unplanned fires as soon as possible to avoid mortality.

Impact Phase: Operation

Nature of the impact: Potential faunal mortality and loss of SCC impacts associated with the operational phase of the proposed development.

Description of Impact: Wildlife and floral communities face direct mortality due to increased traffic and human presence, coupled with illegal collection, poaching, and entrapment. Avifaunal and bat species also face collision risks with turbine blades. The wind farm should implement operational biodiversity monitoring to understand and compare post-construction impacts with baseline (pre-construction) conditions. This will help create an adaptive management approach to effectively manage direct mortality to terrestrial floral and faunal communities. The following impact table outlines the potential risks associated with these factors and suggests mitigation measures to minimize adverse effects on biodiversity during the operational phase. The impacts of direct mortality is High before mitigation measures are implemented. Extreme loss of species impacts biodiversity and the ecological processes that helps keep localized communities intact and ecosystems functioning.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probable
Score	2	4	5	4	4

Impact Phase: Operation					
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Low Negative Impact (20)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- An environmental induction for all construction staff on site to identify SCC.
- Demarcate sensitive areas, where SCC have been confirmed present near the development footprint as No-Go areas.
- Site access should be controlled, and no unauthorised persons should be allowed onto the site to limit illegal harvesting.
- The collection or harvesting of any plants at the site should be strictly forbidden.
- Bird and bat carcass searchers must be deployed at the WEF and all findings to be reported to an appropriate bird and bat specialist. Refer to recommendations in the Avifaunal Specialist Impact Assessment and Bat Specialist Impact Assessment.
- The WEF must report all fatalities of SCC to a competent or Interested and Affected Party on a quarterly basis.
- All vehicles must adhere traffic rules on the site with a maximum speed of 30km to be implemented. Alternatively, consult and enforce all recommendations in the Traffic Impact Assessment.
- Limit driving at night on the site, between dusk and dawn, when fauna are most active.
- No hunting permitted.
- No dogs or cats permitted (other than those of the landowner).
- Waste management programme to prevent trash buildup attracting species such as crows.
- Roadkill to be immediately reported, removed and suitably disposed of to prevent scavenging (e.g., buried).

Residual impact	Residual impacts include loss flora and fauna SCC from the natural environment.

Impact Phase: Operation					
Nature of the impact: Potential soil erosion impacts associated with the operational phase of the proposed development.					
Description of Impact: Soil erosion facilitated by clearing vegetation and increased road use promotes soil displacement and loss during the Operational Phase.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probably
Score	2	4	5	4	4

Impact Phase: Operation					
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Low Negative Impact (20)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required.
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed.
- Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area, including where such crosses waterbodies.
- Rehabilitate existing servitude and access roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of vegetation.
- Construction activities in or near drainage lines, washes or temporary inundated depressions must only take place during the dry season.
- An EMPr must be implemented and must provide a detailed description of how construction activities must be conducted to avoid increased erosion.
- Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan included in the EMPr.
- All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk.
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance during the operation of the project.

Residual impact	Residual impacts include changes to infiltration rates and loss of soil fertility.

10.4 FAUNAL

10.4.1 CONSTRUCTION AND DECOMMISSIONING PHASE

The anticipated impacts for the operational phase of the proposed development are:

- Habitat Fragmentation
- Potential Encroachment of Alien Invasive Species
- Light, Noise and Visual Pollution
- Faunal Mortality and Loss of SCC
- Soil erosion
- Unwanted Fires

Their significance with and without the recommended mitigation measures are assessed in the tables below.

<table>
<tr><td colspan="6">Impact Phase: Construction</td></tr>
<tr><td colspan="6">Nature of the impact: Direct habitat loss can result from vegetation clearing and fire frequency.</td></tr>
<tr><td colspan="6">Description of Impact: The removal of vegetation will be required for the construction of roads, turbine hard-stands, laydown areas and site offices. Artificially altered fire regimes may reduce habitat suitability for SCCs by changing vegetative communities and habitat structure. None of the proposed WTG bases are in areas of high sensitivity for animal SCCs. Approximately 70% of the internal roads will be following existing tracks. However, both existing and newly proposed roads traverse areas identified to be of high sensitivity.

Approximately 27 ha of land within high sensitivity areas is associated with new roads and an increased width of existing tracks (up to 12 m). It is recommended that mitigation action specific to the restoration and rehabilitation of several strategic areas that are currently highly modified through agricultural activity be initiated during the construction phase and continue through to the operational phase. These areas have been identified by this study to improve habitat availability and connectivity between patches for faunal SCCs across the site and broader area.

An area of approximately 260 ha has been identified here for restoration. This would result in a significant increase in habitat availability, reduced edge effects and improved connectivity between existing habitat patches known to support SCCs. These factors have been identified in the literature to be of high conservation priority for all relevant SCCs listed. A net-gain, in-situ biodiversity offset is considered to be a highly desirable, positive impact if appropriately implemented.</td></tr>
<tr><td colspan="6">Impact Status: Negative, positive with mitigation</td></tr>
<tr><td></td><td>Extent</td><td>Duration</td><td>Reversibility</td><td>Magnitude</td><td>Probability</td></tr>
<tr><td>Without Mitigation</td><td>Site</td><td>Medium term</td><td>Recoverable</td><td>Moderate</td><td>Highly Probable</td></tr>
<tr><td>Score</td><td>1</td><td>3</td><td>3</td><td>3</td><td>4</td></tr>
<tr><td>With Mitigation</td><td>Local</td><td>Medium term</td><td>Recoverable</td><td>Moderate</td><td>Highly Probable</td></tr>
<tr><td>Score</td><td>2</td><td>3</td><td>3</td><td>3</td><td>4</td></tr>
<tr><td>Significance Calculation</td><td colspan="2">Without Mitigation</td><td colspan="3">With Mitigation</td></tr>
<tr><td>S=(E+D+R+M)*P</td><td colspan="2">Moderate Negative (40)</td><td colspan="3">Moderate Positive (44)</td></tr>
<tr><td>Was public comment received?</td><td colspan="5">No</td></tr>
<tr><td>Has public comment been included in mitigation measures?</td><td colspan="5">No</td></tr>
<tr><td colspan="6">Mitigation measures to reduce residual risk or enhance opportunities:

• The production of an appropriate rehabilitation and restoration plan with the aims of improving and monitoring habitat availability and connectivity, in consultation with specialists and relevant stakeholders (e.g., CapeNature, Endangered Wildlife Trust) prior to construction;
• Strategic rehabilitation and restoration of currently modified areas within areas of high sensitivity to be initiated concurrently with the construction phase;
• Minimization of development footprint and utilization of existing roads and existing modified areas for temporary laydown areas and site buildings;
• Rehabilitate disturbed areas that are not required by the operational phase of the development;</td></tr>
</table>

- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed;
- An environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as avoiding fire hazards, littering, appropriate handling of pollution and chemical spills, minimizing wildlife interactions, remaining within demarcated construction areas;
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill;
- No open fires to be permitted outside of designated areas.

Residual impact	Some residual impact is likely, however, available habitats are widespread and the size of the development footprint is relatively small compared to the total project area. An in-situ biodiversity offset would result in a net-gain.

Impact Phase: Construction

Nature of the impact: Indirect habitat loss includes the potential for reduced connectivity between habitat patches and restricted movement of animal SCCs, altered flow regimes and overgrazing.

Description of Impact: Construction activities and novel infrastructure (such as perimeter fencing and roads) may exclude species from portions of suitable habitat by restricting their movement across the landscape. Changes to water flow characteristics such as runoff, sedimentation and infiltration from compacted or hard surfaces could alter the vegetative community composition, soil depth and habitat suitability. Areas used during construction becoming unavailable for livestock grazing may concentrate livestock towards areas of high habitat suitability for animal SCCs.

As above, a restoration and rehabilitation programme initiated concurrently with the construction phase is recommended to result in a net-gain, positive impact to indirect habitat loss by improving connectivity and facilitating improved faunal movement across the site.

Impact Status: Negative, positive with mitigation

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	Moderate	Probable
Score	2	3	3	3	3
With Mitigation	Local	Medium term	Recoverable	Moderate	Highly Probable
Score	2	3	3	3	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (33)			Moderate Positive (44)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- The production of an appropriate rehabilitation and restoration plan with the aims of improving and monitoring habitat availability and connectivity, in consultation with specialists and relevant stakeholders (e.g., CapeNature, Endangered Wildlife Trust) prior to construction;
- Strategic rehabilitation and restoration of currently modified areas within areas of high sensitivity to be initiated concurrently with the construction phase;

- Fencing and road designs to allow for passage of animals (e.g., appropriately sized culverts in roads and wildlife friendly fencing);
- Appropriate water runoff control measures to be constructed on all hard surfaces;
- Appropriate erosion control measures to be constructed on all servitudes and access roads in the project area;
- Rehabilitate existing servitude and access roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of vegetation.

Residual impact	Net-gain of available habitat and connectivity through restoration of potential movement corridors currently modified by agricultural activity.

Impact Phase: Construction

Nature of the impact: The displacement or disturbance of fauna due to construction activities

Description of Impact: The increase in construction activity, sound, movement of machinery and operation of equipment may disturb and/ or displace animal SCCs from the vicinity of construction potentially influencing movement, foraging activity, breeding and impacting energy budgets. The probability of disturbance and displacement for animal SCCs relevant to the study area would be greatly reduced through the avoidance of construction activities between dusk and dawn given the nocturnal nature of species that may be particularly sensitive to disturbance.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Short term	Recoverable	High	Highly Probable
Score	1	2	3	4	4
With Mitigation	Site	Short term	Recoverable	Moderate	Low Probability
Score	1	2	3	3	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (40)			Low Negative (18)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Restrict construction activity to daylight hours.
- Minimize activity that occurs between dusk and dawn.
- Pre-construction baseline animal monitoring programme, with focus on areas identified for the construction footprint during the design phase (e.g., road network).
- Avoidance of highly sensitive habitats for laydown areas and temporary site offices.
- Clearly demarcated construction areas and no unauthorized personnel to be permitted beyond demarcated areas.
- Adequate noise reduction measures (where possible) on heavy machinery.
- Construction areas and site buildings should be lit with as little light as practically possible, with lights directed downwards where appropriate to reduce the disturbance and foraging activities of nocturnal species.

- No dogs or cats other than those of the landowners permitted on site as these animals cause unnecessary disturbance such as chasing fauna.

Residual impact	None

Impact Phase: Construction

Nature of the impact: Direct impact to fauna caused by construction activities, such as increased risk of injury or mortality from collision with vehicles due to increased traffic, the increased possibility of illegal hunting, poaching, persecution or harvesting of fauna

Description of the impact: 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. Increased frequency of vehicle movement associated with construction activity increases the possibility of vehicles colliding with animals resulting in roadkill fatalities. Tortoises, snakes and amphibians are particularly susceptible to collisions; however, many other species are also at risk such as Aardwolf, Bat-eared Fox, rabbits/hares, Steenbok and porcupine, particularly at night. Many of these impacts can, however, be effectively managed or mitigated against.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Short term	Recoverable	High	Highly Probable
Score	1	2	3	4	4
With Mitigation	Site	Short term	Recoverable	High	Low Probability
Score	1	2	3	4	2

Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	Moderate Negative (40)	Low Negative (20)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation measures to reduce residual risk or enhance opportunities:

- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be permitted;
- No movement of construction vehicles between dusk and dawn;
- Implementation and enforcement of speed limits (30 km/h);
- Roadkill monitoring and recording programme;
- Induction toolbox talk to construction personnel to increase awareness about animal SCCs present and roadkill risks;
- No unauthorized movement of personnel;
- No unauthorized access to the construction site;
- No trenches or excavations to be left uncovered overnight;
- Trenches, excavations and cattle grids to have slopes to allow for animals to escape should they fall in;
- No hunting permitted;
- No dogs or cats permitted (other than those of the landowner);

- The collection, hunting or harvesting of animals at the site should be strictly forbidden; and
- Any fauna directly threatened by the construction activities should be removed to a safe location by the environmental control officer or other suitably qualified person

Residual impact	None

Impact Phase: Construction

Nature of the impact: Mortality of animal SCCs can result indirectly from construction phase activity

Description of the impact: Through increased predator presence or competition and decreased predator detection. Waste from construction camps and carcasses associated with roadkill can attract species such as crows, which depredate on various animals including juvenile rabbits. Increased noise from construction activities may also mask natural sounds and reduce the ability for animals to detect the presence of predators. Foraging efficiencies may also be altered. Appropriate construction scheduling and management plans can significantly mitigate these impacts.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Short term	Recoverable	High	Highly Probable
Score	1	2	3	4	4
With Mitigation	Site	Short term	Recoverable	High	Low Probability
Score	1	2	3	4	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative (40)		Low Negative (20)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Waste management programme to prevent trash buildup attracting species such as crows;
- Roadkill to be immediately reported to the environmental control officer, removed and suitably disposed of to prevent scavenging (e.g., buried);
- Construction activity to be minimized during the night to reduce noise pollution during periods when Riverine Rabbit are most active.

Residual impact	None

10.4.2 OPERATION PHASE

The following impacts are identified as the major impacts that are likely to be associated with the development of the Hugo WEF:

- Direct Habitat Loss
- Indirect Habitat Loss
- Disturbance/displacement
- Direct Mortality
- Indirect Mortality

Impact Phase: Operational					
Nature of the impact: Direct habitat loss through altered fire regimes					
Description of the impact: Artificially altered fire regimes may reduce habitat suitability/availability by changing vegetative communities and habitat structure.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	High	Highly Probable
Score	2	4	3	4	4
With Mitigation	Local	Long term	Recoverable	High	Low Probability
Score	2	4	3	4	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (52)			Low Negative (26)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Waste management programme to prevent trash buildup attracting species such as crows;
- Roadkill to be immediately reported to the environmental control officer, removed and suitably disposed of to prevent scavenging (e.g., buried); and
- Construction activity to be minimized during the night to reduce noise pollution during periods when Riverine Rabbit are most active.

Residual impact	None

Impact Phase: Operational

Nature of the impact: Effective reduction in available habitat through restriction of animal movement, reduced habitat integrity or increased competition

Description of the impact: Novel infrastructure (e.g., perimeter fencing) may exclude species from portions of suitable habitat by restricting animals' movement across the landscape. Altered hydrology, infiltration rates, sedimentation, erosion and spread of invasive species may reduce habitat suitability/availability by changing vegetative communities and habitat structure. Previously used areas may become unavailable for grazing and may alter grazing patterns, potentially concentrating livestock in areas of high habitat suitability for various SCCs.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	High	Highly Probable
Score	2	4	3	4	4
With Mitigation	Local	Long term	Recoverable	High	Low Probability
Score	2	4	3	4	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative (52)		Low Negative (26)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Wildlife friendly road and fence crossings to be frequently serviced to facilitate passage of fauna across the site (e.g., road culverts to be cleared of debris);
- Livestock grazing pressure must be reduced in natural, near-natural and recovered areas;
- Flow and erosion control measures to be continually monitored for efficacy and remedied if pooling, sedimentation or erosion is observed;
- Previously disturbed areas such as road verges, lay-down areas and areas utilized by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread;
- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible

Residual impact	None

Impact Phase: Operational

Nature of the impact: Disturbance and/ or displacement of animals due to routine operational activity

Description of Impact: Operational activities may disturb and/ or displace certain animal SCCs from the vicinity of infrastructure.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability

Without Mitigation	Local	Long term	Reversible	High	Highly Probable
Score	2	4	1	4	4
With Mitigation	Local	Long term	Reversible	High	Low Probability
Score	2	4	1	4	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (44)			Low Negative (22)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Minimized lighting;
- Minimize activity that occurs between dusk and dawn;
- Adequate noise reduction measures (where possible) on machinery;
- Wind Turbine Generators should not spin below a certain cut-in speed, i.e., no free-spinning of WTG blades permitted;
- Speed limits should be strictly enforced to reduce unnecessary noise;
- No dogs or cats other than those of the landowners should be allowed on site as these animals cause unnecessary disturbance such as chasing fauna;
- If possible, long-term animal monitoring programme;
- If possible, establishment of stewardship programme to research and conserve Riverine Rabbit with collaboration with appropriate stakeholders (e.g., CapeNature, EWT)

Residual impact	Elevated background noise levels

Impact Phase: Operational

Nature of the impact: Direct mortality through collision, entrapment and illegal collecting or poaching of animals

Description of Impact: Increased frequency of vehicle movement associated with operational activity increases the possibility of vehicles colliding with animals, resulting in roadkill fatalities. Animals may become entangled or entrapped in fencing or cattle grids.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Reversible	High	Highly Probable
Score	2	4	1	4	4
With Mitigation	Local	Long term	Reversible	High	Low Probability
Score	2	4	1	4	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	

S=(E+D+R+M)*P	Moderate Negative (44)	Low Negative (22)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation measures to reduce residual risk or enhance opportunities:

- Strictly enforced speed limits;
- Strictly controlled site access;
- Minimized movement of personnel vehicles at night;
- Wildlife friendly road crossings (including culverts that allow animal movement below the road surface);
- Signage, education and awareness induction training about relevant animal SCCs to personnel; and
- Wildlife-friendly fencing and cattle grids.

Residual impact	None

Impact Phase: Operational

Nature of the impact: Indirect mortality from increased predator densities and/ or reduced predator avoidance ability

Description of the Impact: 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, and/ or crows which prey on various animal SCCs. 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.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Long term	Irreversible	High	Highly Probable
Score	1	4	5	4	4
With Mitigation	Site	Long term	Recoverable	low	Probable
Score	1	4	3	2	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (56)			Low Negative (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

Impact Phase: Operational	
• Overhead Transmission Lines to be of a type and design that reduces nesting opportunities (e.g., solid pylon design); • Nest and perch deterrents on transmission line pylons; • Waste management programme to be implemented; • Roadkill to be reported and immediately removed for adequate disposal that prevents scavenging (e.g., buried); • Operational studies on sound and animal populations (e.g., Riverine Rabbit) across the site; and • No spinning wind turbine generators at wind speeds below a certain cut-in speed (i.e. no free-spinning blades).	
Residual impact	Elevated background noise levels

Impact Phase: All					
Nature of the impact: Impacts of all phases of the proposed development on ecological processes of the area					
Description of impact: Impacts on broad-scale ecological processes include the obstruction or enhancement of corridors and connectivity between individuals of SCC populations, animal dispersal and gene flow. While ecological processes such as fire regimes, hydrology and connectivity have been considered across several of the impacts previously assessed, opportunity exists to enhance connectivity of the east with more elevated areas in the south and west of the study area. The establishment of corridors across the study site, through the rehabilitation of currently modified agricultural land, would allow access of SCCs in the area to potential climate refugia.					
Impact Status: Negative, Positive with mitigation					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	High	Highly Probable
Score	2	4	3	4	4
With Mitigation	Local	Long term	Recoverable	High	Probable
Score	2	4	3	4	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (52)			Moderate Positive (39)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Where required, in-situ biodiversity offset designed to improve connectivity between natural/near-natural patches and facilitate animal SCC movement across the site (do be done by a specialist in consultation with appropriate stakeholders); • Restoration and rehabilitation of currently modified agricultural land;					

- If possible, partner with the Drylands Conservation Programme of the Endangered Wildlife Trust to enhance the ecosystem processes across the site, e.g. through the Biodiversity Stewardship Programme and/ or the provision of research support;
- If possible, initiation of formal, long-term research programmes across the site - offering access to the property for the purposes of research on riverine rabbit if/when approached by appropriately recognised academic instututions;
- Site-specific Environnemental Management Programme.

Residual impact	Enhancement of ecological processes

10.5 FLORA

The impacts that will be most prevalent during the Construction Phase of the proposed Hugo WEF are:

- Vegetation Clearing
- Chemical Contamination
- Altered Flow Regimes
- Mortality

10.5.1 CONSTRUCTION AND DECOMMISSIONING PHASES

Impact Phase: Construction/ Decommissioning					
Nature of the impact: Potential vegetation clearing impacts associated with the construction and decommissioning phase of the proposed development					
Description of Impact: Certain areas will need to be cleared of vegetation to facilitate construction of associated infrastructure and transport of personnel on site. This impact will negatively affect endemic, threatened or important flora species.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium Term	Recoverable	Moderate	Highly Probable
Score	2	3	3	3	4
With Mitigation	Site	Short Term	Recoverable	Low	Probable
Score	1	2	3	2	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (44)		Low Negative Impact (24)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • The development footprint must avoid No-Go/ High Sensitivity areas as much as possible.					

Impact Phase: Construction/ Decommissioning	
• Limit the area of impact as much as possible. • Where micro-siting takes place, a pre-construction walkthrough during the optimal flowering period (spring) of the finalized development layout must be conducted to ensure that No-Go and High Sensitivity areas are avoided where possible. • Ensure that lay-down and other temporary infrastructure are within Low Sensitivity areas. • Rehabilitate disturbed areas that are not required by the operational phase of the development. • All construction staff on site must attend an environmental induction to ensure that basic environmental principles are adhered to. This includes topics such as avoiding fire hazards, no littering, appropriate handling of pollution and chemical spills, remaining within demarcated construction areas, avoidance of No-Go areas and sensitive habitats etc. • Demarcate sensitive areas near the development footprint as no-go areas with construction tape or similar and clearly marked as No-Go areas. • An EMPr must be implemented and must provide a detailed description of how construction activities must be conducted to reduce unnecessary clearing and/or destruction of habitat.	
Residual impact	Residual impacts are expected to occur for the area and may be relevant in soil erosion and alien invasive species establishing themselves before natural flora can. All mitigation measures would need to be adhered to and continuous monitoring and maintenance is required after construction.

Impact Phase: Construction					
Nature of the impact: Potential chemical contamination impacts associated with the construction phase of the proposed development.					
Description of Impact: Chemical contamination during the Construction phase. Spillage of construction materials or chemicals can adversely impact waterbodies and the flora on which they depend.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	High	Highly Probable
Score	2	3	3	4	4
With Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (48)			Low Negative Impact (27)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • The development footprint must avoid High Sensitivity areas as much as possible.					

Impact Phase: Construction	
• Ensure proper storage and handling of chemicals (fuel, lubricants, cleaning agents) used on-site. Store all chemicals in designated areas equipped with spill containment measures to prevent leaks and spills. • A chemical spill response plan must be developed before construction activities are undertaken. This spill response plan must be implemented by an ECO on site. • Provide appropriate training to construction staff on the safe handling of chemical and hazardous materials. • Implement measures to prevent runoff to nearby waterbodies by installing sediment traps and/or containment pods. This should be addressed in the Stormwater Assessment.	
Residual impact	Residual impacts are expected to occur for the area and may be relevant in aquatic systems on site as well as soil cover. The use of chemicals on site should be limited as far as possible and environmentally friendly alternatives should be utilized, resulting in no major residual impacts associated with the phase.

Construction activities can potentially lead to altered water flow due to increased surface runoff caused by vegetation clearing. Altered water regimes can create more favourable conditions for alien invasive species, thus negatively impacting native flora who are not able to compete in a new environment fast enough. Adequate flow and erosion management mitigations would need to be addressed in the EMPr.

Impact Phase: Construction					
Nature of the impact: Potential altered flow regime impacts associated with the construction phase of the proposed development.					
Description of Impact: 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 over time.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium term	Recoverable	High	Highly Probable
Score	2	3	3	4	4
With Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (48)		Low Negative Impact (27)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Adequate flow and erosion control measures should be included in the EMPr.					

Impact Phase: Construction	
• Ongoing monitoring and rehabilitation of disturbed areas must be implemented. • All recommendations in the Stormwater Assessment must be strictly adhered to.	
Residual impact	Vegetation clearing may impact runoff and infiltration rates. As a result, residual impacts may occur after mitigation measures have been applied, but these impacts are manageable.

Impact Phase: Construction/ Decommissioning					
Nature of the impact: Potential mortality of flora species due to direct and indirect impacts associated with the construction and decommissioning phase of the proposed development.					
Description of Impact: Direct mortality due to increased traffic and illegal collection and indirect mortality due to potential increased herbivore presence and decreased detection can occur during the Construction and Decommissioning Phase.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	Very High	Highly Probably
Score	2	4	5	5	4
With Mitigation	Site	Medium term	Recoverable	High	Probable
Score	1	3	3	4	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (64)		Moderate Negative Impact (33)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • No movement of construction vehicles between dusk and dawn. • Induction toolbox talk to construction personnel to increase awareness about flora SCCs present. • No unauthorized movement of personnel. • No unauthorized access to the construction site. • A Plant Rescue and Rehabilitation Plan must be designed by an ecologist before construction takes place and implemented during all phases of the project lifecycle.					
Residual impact	Residual impacts include direct mortality of species of conservation concern as a result of activities associated with the WEF.				

10.5.2 OPERATIONAL PHASE

The anticipated impacts for the operational phase of the proposed development are:

- Potential Encroachment of Alien Invasive Species
- Flora Mortality and Loss of SCC
- Soil erosion
- Unwanted Fires

Impact Phase: Operation					
Nature of the impact: Potential encroachment of alien invasive species resulting in loss of flora SCC associated with the operational phase of the proposed development.					
Description of Impact: Movement of personnel, and increased disturbance puts the proposed development area at greater risk of alien invasive species moving into and spreading within the area. Alien invasive species will encroach into disturbed areas left behind by construction activities and may go undetected during the operational phase. This impact results in the potential loss of flora SCC or endemic species.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Definite
Score	2	4	5	5	5
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (80)		Low Negative Impact (20)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Disturbed areas such as road verges, lay-down areas and areas utilised by temporary construction facilities must be regularly monitored to detect the establishment of alien species and those species should be eradicated before they spread.
- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned, the use of herbicides should be avoided as far as possible.
- The use of herbicides (if absolutely required) for the control and eradication of alien grasses should be done in accordance with the alien eradication programme in the EMPr to reduce unintended ecological impacts.

Residual impact	Residual impacts include loss of natural flora and suitable habitat due to encroachment of alien invasive species.

Impact Phase: Operation					
Nature of the impact: Potential fire impacts associated with the operational phase of the proposed development.					
Description of Impact: Increased personnel on site increases the fire risk due to smoking and/or use of electrical equipment on site.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probably
Score	2	4	5	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Probable
Score	1	3	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (60)		Low Negative Impact (30)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- No open fires should be permitted outside of designated areas.
- Smoking areas must be defined, and no smoking should be permitted outside of designated areas.
- An emergency response plan for uncontrolled fires must be in place prior to operation and implemented for the duration of the WEF's lifespan.
- All staff members must have a Fire and Safety induction to increase awareness.

Residual impact	Residual impacts include loss of flora SCC. This is why it is critical to manage unplanned fires as soon as possible to avoid mortality.

Impact Phase: Operation					
Nature of the impact: Potential floral mortality and loss of SCC impacts associated with the operational phase of the proposed development.					
Description of Impact: Direct mortality/loss of flora species is anticipated due to increased traffic on site and illegal collection. Targeted illegal harvesting may pose a risk as the WEF may offer greater ease of access to the public.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probable

Impact Phase: Operation					
Score	2	4	5	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Moderate Negative Impact (20)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- An environmental induction for all construction staff on site to identify SCC.
- Demarcate sensitive areas, where SCC have been confirmed present near the development footprint as No-Go areas.
- Site access should be controlled, and no unauthorised persons should be allowed onto the site to limit illegal harvesting.
- The collection or harvesting of any plants at the site should be strictly forbidden.
- Establish a monitoring program to assess the effectiveness of mitigation measures and track changes in floral communities over time. Use the results of monitoring to inform adaptive management strategies and make adjustments as needed to minimize direct floral mortality and optimize conservation outcomes.

Residual impact	Residual impacts include loss flora SCC from the natural environment.

Impact Phase: Operation					
Nature of the impact: Potential soil erosion impacts associated with the operational phase of the proposed development.					
Description of Impact: Soil erosion facilitated by clearing vegetation and increased road use promotes soil displacement and loss during the Operational Phase.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Irreversible	High	Highly Probably
Score	2	4	5	4	4
With Mitigation	Site	Medium term	Recoverable	Moderate	Low Probability
Score	1	3	3	3	2

Impact Phase: Operation		
Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	Moderate Negative Impact (60)	Low Negative Impact (20)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation measures to reduce residual risk or enhance opportunities:

- Utilize existing servitudes and access roads wherever possible, any new roads or the upgrading of roads should be minimized as far as possible and not be larger than required.
- All construction vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed.
- Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area, including where such crosses waterbodies.
- Rehabilitate existing servitude and access roads in the project area with sufficient erosion control measures to prevent the loss of soil and the degradation of vegetation.
- Construction activities in or near drainage lines, washes or temporary inundated depressions must only take place during the dry season.
- An EMPr must be implemented and must provide a detailed description of how construction activities must be conducted to avoid increased erosion.
- Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan included in the EMPr.
- All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate energy in the water stream which may pose an erosion risk.
- Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance during the operation of the project.

Residual impact	Residual impacts include changes to infiltration rates and loss of soil fertility.

10.6 AVIFAUNA

The avifaunal community is comprised most importantly of raptors, cranes and bustards. All high-risk areas for birds have been avoided by placing turbines out of the high sensitivity and no-go areas and by placing buffers around nests in accordance with current Best Practice Guidelines. The potential impact to the avian community is provided for each proposed phase, i.e., construction, operation and decommission of the proposed development.

The following impacts are identified as the major impacts that are likely to be associated with the development of the Hugo WEF:

- Displacement of Priority species due to disturbance

10.6.1 CONSTRUCTION PHASE

Impact Phase: Construction
Nature of the impact: Displacement of Priority species due to disturbance

Impact Phase: Construction					
Description of Impact: Generally negative due to displacement of Priority species due to disturbance associated with the construction of the wind turbines and associated infrastructure. No direct fatalities of birds expected during this phase. Generally short term (approx. 24 months)					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Short term	High	High	Highly likely
Score	2	2	4	4	4
With Mitigation	Site	Short term	High	Medium - High	Probable
Score	2	2	4	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate - High Negative Impact (44)			Moderate Negative Impact (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation for WEF site construction: • Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible and should avoid all sensitive areas (e.g., CRM-designated high-risk areas, wetlands). • Measures to control noise and dust should be applied according to current best practice in the industry. • Roads and tracks to avoid all identified sensitive areas wherever possible. • An avifaunal walk-down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the EIA process and the construction phase.					
Residual impact	The disturbance of birds is somewhat inevitable by activities on site, although the most sensitive receptors (e.g., CRM-designated high-risk areas) have already been protected through avoidance, through the application of No-Go buffers. Post-construction monitoring recommended by Birdlife South Africa guidelines will help identify residual impacts should they occur and recommend further mitigations, if required.				

The following impacts are identified as the major impacts that are likely to be associated with the operation of the Hugo WEF:

- Bird Collision, habitat alteration and displacement

10.6.2 OPERATION PHASE

Impact Phase: Operation
Nature of the impact: Bird Collision, habitat alteration and displacement

Impact Phase: Operation					
Description of Impact: Generally negative due to potential for collision, habitat alteration and displacement, of five Red Data species or two Least Concern species through the operation of the turbines and activity on site					
Impact Status: Negative					
	EXTENT	DURATION	REVERSIBILITY	MAGNITUDE	PROBABILITY
Without Mitigation	Site	Long term	High	High	Highly Likely
Score	4	4	4	5	4
With Mitigation	Site	Long term	High	Medium – High	Probable
Score	4	4	4	4	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (56)		Moderate - Low Negative Impact (39)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Re-position all turbines that fall within the high-risk zones delineated by the CRM to lower risk areas (as also identified by the CRM).
- The high-risk No-Go zones delineated by the CRM should be adhered to (as depicted in this report).
- A post-construction programme must be conducted by an avifaunal specialist (following the Birds and Renewable Energy Specialist Group guidelines) to:
- (i) assess turbine-related fatalities; and
- (ii) confirm that all mitigations have been appropriately adhered to and, in particular, that road and hard stand verges do not provide additional substrate for raptor prey species.
- A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site, prior to construction. This policy should form an annexure of the operational EMP for the facility. Most importantly, this policy should identify the number of bird fatalities of Priority species which will trigger a management response, appropriate responses, and timelines for such responses. In general, it is recommended that should one Red Data species or two or more LC species be killed per turbine per year then those turbines will require further mitigation. Should the identified Priority bird species fatality thresholds be exceeded in Year 1 and 2, either (i) an automated turbine Shutdown on Demand (SDOD) programme must be immediately initiated; or
- (ii) appropriate alternative mitigation (e.g. striped blade, human-SDOD) must be implemented on site. The latter programme must consist of a suitably qualified, trained, and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points (VPs) with full visible coverage of all turbine locations (typically 1 VP covering four turbines). The observers must detect incoming Priority bird species, track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine until the risk has passed. A full detailed method statement or protocol must be designed by an ornithologist.

Impact Phase: Operation	
Residual impact	Direct mortality through collision, or area avoidance, may occur if cranes, raptors, and bustards remain here and the mitigations are insufficient. This possibility can be gauged from a systematic monitoring programme. There is some uncertainty around the effectiveness of bird-turbine collision mitigation at this stage in South Africa. As a result, the significance remains as "Moderate" post mitigation. Note that these can be reduced with additional mitigations.

10.7 BATS

10.7.1 CONSTRUCTION PHASE

The impact of the proposed Hugo WEF on bats in the area is discussed below. The potential impacts during the construction phase are summarised as:

- Clearing and excavation of natural habitat;
- Creating attractive bat habitat within the development terrain; and
- Disturbance of bats and bat roosts by construction noise, especially during night-time.

Impact Phase: Construction					
Nature of the impact: Clearing and excavation of natural habitat					
Description of Impact: The destruction of features that could serve as potential roosts, such as rock formations and derelict aardvark holes, and the removal of trees or the fragmentation of woody habitat which includes dense bushes. The removal of limited trees and bushes would have also an impact on the foraging potential of clutter and clutter-edge-specific species.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short Term	Recoverable	Moderate	Definite
Score	2	2	3	3	5
With Mitigation	Local	Short Term	Recoverable	Low	Probable
Score	2	2	3	2	3
S=(E+D+R+M)*P	Moderate Negative Impact (50)		Low Negative Impact (27)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities:					

Impact Phase: Construction	
• Apart from access roads and the management building, construction activities are to be kept out of all high bat-sensitive areas as far as possible. • Rock formations occurring along the ridge lines should be avoided during construction, as these could serve as roosting space for bats. • Destruction of limited trees should be avoided during construction. • Care should be taken if any dense bushes are destroyed, to make sure that there are no bat roosts in the vegetation. If bat roosts are found, a bat specialist should be contacted immediately. • Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats. • The Environmental Control Officer (ECO) or a responsible appointed person or site manager should contact a bat specialist before construction commences so that they know what to look out for during construction.	
Residual impact	Partial residual impact. Natural habitats will be removed and stay as such for the lifespan of the wind farm, but a part of these could be rehabilitated after construction.

Impact Phase: Construction					
Nature of the impact: Creating attractive bat habitat within the development terrain					
Description of Impact: Creating new habitat amongst turbines which might attract bats. This includes buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Recoverable	Moderate	Highly probable
Score	2	3	3	3	4
With Mitigation	Site	Short Term	Reversible	Very Low	Low probable
Score	1	2	1	1	2
S=(E+D+R+M)*P	Moderate Negative Impact (44)		Low Negative Impact (10)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities:					

Impact Phase: Construction	
• Completely seal off roofs of new buildings e.g., substations and site buildings. Note a small bat species could enter a hole the size of 1 cm^2. • Roofs need to be regularly inspected during the lifetime of the wind farm and any new holes need to be sealed. • Excavation areas, quarries or any other artificial depressions should be filled and rehabilitated to avoid creating new areas of open water sources which could attract bats during rainy spells. • No roll-up garage doors should be installed. • Inspect all existing buildings and infrastructure for possible roosting opportunities regularly, at least on a seasonal basis. If any holes are found, the ECO or operational bat specialist should be contacted to establish whether there are any bats in the roofs. If there is a roost in the roof, a bat specialist should be consulted.	
Residual impact	No residual impact if mitigation measures are applied

Impact Phase: Construction					
Nature of the impact: Construction noise					
Description of Impact: Disturbance of bats and bat roosts by construction noise, especially during night-time.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Reversible	Low	Definite
Score	2	2	1	2	5
With Mitigation	Site	Short Term	Reversible	Very Low	Definite
Score	1	1	1	1	5
S=(E+D+R+M)*P	Moderate Negative Impact (35)		Low Negative Impact (20)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Noise levels should be prevented as far as possible. • Avoid night-time construction activities as much as possible.					
Residual impact	No residual impact if mitigation measures are applied				

10.7.2 OPERATION PHASE

The impact of the proposed Hugo WEF on bats in the area is discussed below. The potential impacts during the operation phase are summarised as:

- 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;
- Fatality curiosity;
- Smaller genetic pool; and
- Foraging space lost due to the turning of turbine blades.

Impact Phase: Operation					
Nature of the impact: Direct collision or barotrauma					
Description of Impact: Bat fatalities through direct collision, or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Indefinite	Irreversible	High	Definite
Score	3	5	5	4	5
With Mitigation	Regional	Long term	Recoverable	Moderate	Definite
Score	3	4	4	3	5
S=(E+D+R+M)*P	High Negative Impact (85)		High Negative Impact (70)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- All turbines and turbine components, including the rotor-swept zone, should be kept out of all high-sensitivity zones.
- Mitigation measures, Bat Specialist Report - Section 7, should be applied after testing and as soon as turbines start to turn.
- No turbines should be placed within 200 m of open water sources.
- The lowest sweep of the turbine blade should not be less than 30 m.
- A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or as described by the latest South African bat guidelines.
- Mitigation should be discussed between the bat specialist and developer during the construction and operational phase. Mitigation measures should be applied.

Impact Phase: Operation	
• Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards where possible. Turbine tower lights should be switched off when not in operation, if possible. • Two years of compulsory bat monitoring as per the latest South African Bat Assessment Association (SABAA) bat monitoring guidelines is recommended, but this might be extended, depending on the bat specialist.	
Residual impact	Yes. The fatality of bats is irreversible, and it is expected that there will be a decline in the population of high-risk species, but with mitigation, the bat population will be able to survive and still be functional. The resource will not be damaged irreparably but will be altered.

Impact Phase: Operation					
Nature of the impact: Fatality of migrating bats					
Description of Impact: A limited number of calls like that of Natal Long-fingered bat, a migration species, were recorded. Fruit bats on migration might also traverse the site. Not much research has been conducted on the migration of bats in South Africa, and some of the bat species occurring on-site might also traverse the area during migration.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	National	Long term	Recoverable	Moderate	Probable
Score	4	4	3	3	3
With Mitigation	National	Long term	Recoverable	Low	Low probability
Score	3	4	3	2	2
S=(E+D+R+M)*P	Moderate Negative Impact (42)		Low Negative Impact (24)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Care should be taken during post-construction monitoring to verify the activity of Natal long-fingered bat, especially within the rotor swept area of the turbine blades. Carcasses should be identified to establish the fatality of this species.
- All turbines and turbine components, including the rotor swept zone, should be kept out of all high sensitivity zones.
- No turbines should be placed within 200 m of any open water sources.
- The lowest sweep of the turbine blade should not be less than 30 m.
- Mitigation as proposed in Volume II, Bat Specialist Report - Section 7 should be applied as soon as the test period of turbines is completed, and the turbines start turning.

Impact Phase: Operation	
• A bat specialist should be appointed before the turbines start to turn and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or as described by the latest South African bat guidelines. • Mitigation should be discussed between the bat specialist and developer during the construction and operational phase. Mitigation measures should be applied, using Volume II, Bat Specialist Report - Section 7 - Table 9, as a starting point for discussions. • Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards where possible. Turbine tower lights should be switched off when not in operation, if possible. • Two years of compulsory bat monitoring as per the latest SABAA bat monitoring guidelines is recommended, but this might be extended, depending on the bat specialist.	
Residual impact	Not expected due to the low number of migratory bats, but some of the fruit bats species do not echolocate and one will only truly know the situation through carcass searches during the operational phase.

Impact Phase: Operation

Nature of the impact: Loss of bats of conservation value

Description of Impact: The endemic Long-tailed house bat (Medium to high risk) was recorded and the Southern African Near Threatened Geoffroy's horseshoe bat (Low risk), although not recorded on site, was recorded on a nearby wind farm and might occur in the valley areas and protea veld with relatively denser vegetation.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Long term	Recoverable	Moderate	Probable
Score	3	4	3	3	3
With Mitigation	Regional	Long term	Reversible	Low	Low probability
Score	3	4	1	2	2
S=(E+D+R+M)*P	Moderate Negative Impact (39)		Low Negative Impact (20)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Refer to table above – same mitigation to be implemented

Residual impact	Not expected due to the low number of bats of conservation value that have been recorded, but one will only truly know the situation through carcass searches during the operational phase.

Impact Phase: Operation					
Nature of the impact: Fatality curiosity					
Description of Impact: Bat mortality due to the attraction of bats to wind turbines (Horn et al. 2008). Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Recoverable	Moderate	Probable
Score	2	4	3	3	3
With Mitigation	Local	Long term	Reversable	Low	Probable
Score	2	4	1	2	3
S=(E+D+R+M)*P	Moderate Negative Impact (36)		Low Negative Impact (28)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimized, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.
- Little is known about this impact and mitigation could be adapted if more research becomes available.

Residual impact	With mitigation, it is not expected that there will be a residual impact.

Impact Phase: Operation

Nature of the impact: Smaller genetic pool

Description of Impact: Reduction in the size, genetic diversity, resilience, and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Long term	Irreversible	Moderate	Highly probable
Score	3	4	5	3	4
With Mitigation	Regional	Long term	Recoverable	Low	Probable
Score	3	4	4	2	3
S=(E+D+R+M)*P	Moderate Negative Impact (60)		Moderate Negative Impact (39)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- All turbines and turbine components, including the rotor swept zone, should be kept out of all high sensitivity zones.
- Mitigation as proposed in Volume II – Bat Specialist Report - Section 7 should be applied as soon as the test period of turbines is completed, and the turbines start turning.
- A bat specialist should be appointed before the turbines start to turn and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or as described by the latest South African bat guidelines.
- Mitigation should be discussed between the bat specialist and developer during the construction and operational phase. Mitigation measures should be applied, using Volume II – Bat Specialist Report - Section 7 - Table 9 as a starting point for discussions.
- Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards where possible. Turbine tower lights should be switched off when not in operation, if possible.
- Two years of compulsory bat monitoring as per the latest SABAA bat monitoring guidelines is recommended, but this might be extended, depending on the bat specialist.

Residual impact	There might be a residual impact if the genetic pool is reduced due to high fatality resulting from the wind farm. It will depend on the severity of the negative impact and it might take decades to recover.

10.7.3 DECOMMISSION PHASE

The impact of the proposed Hugo WEF on bats in the area is discussed below. The potential impacts during the Decommission phase are summarised as:

- Disturbance due to decommissioning activities.

Impact Phase: Decommissioning					
Nature of the impact: Decommissioning activities					
Description of Impact: Decommissioning activities at the end of the wind farm's lifespan					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Recoverable	Moderate	Definite
Score	1	2	2	3	5
With Mitigation	Local	Short term	Reversable	Low	Definite
Score	1	2	1	2	5
S=(E+D+R+M)*P	Moderate Negative Impact (40)		Low Negative Impact (30)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Artificial lighting during decommissioning should be minimized as much as possible, especially bright lights or spotlights. Lights should avoid skyward illumination. • Night-time decommissioning activities should be avoided as far as possible.					
Residual impact	If mitigation measures are followed there should be no residual impact.				

10.8 HERITAGE AND ARCHAEOLOGY

During the construction of the WEF, the following activities may result in physical impacts to the landscape and to heritage resources that lie in or on it:

- Excavations to construct the foundations for WTGs and other WEF infrastructure;
- Leveling of ground for WTG and other laydown areas;
- Construction of roads or tracks to service the installation of the WTGs and their longer-term maintenance during operation; and
- Introduction of vehicles, machinery and people into environment.

The introduction of semi-industrial features to the area can have an impact on the cultural landscape.

10.8.1 CONSTRUCTION PHASE, OPERATION AND DECOMMISSIONING

From the information collected for the HIA, indications are that impacts to pre-colonial archaeological sites and material are unlikely or will be very limited.

Significant impacts on archaeological resources during the construction, operational and de-commissioning phases of the Hugo WEF are thus not anticipated.

Impact Phase: Construction					
Nature of the impact: Disturbance or destruction of archaeological sites and/or materials					
Description of Impact: Disturbance or destruction of archaeological sites and/or materials resulting from earthworks and excavations associated with the WEF. This includes: • Excavations to construct the foundations for WTGs and other WEF infrastructure; • Leveling of ground for WTG, laydown areas and the substation; and • Construction of roads or tracks to service the installation of the WTGs and their longer-term maintenance during operation.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Permanent	Irreversible	Low	Low Probability
Score	2	3	5	2	2
With Mitigation	Local	Permanent	Irreversible	Very Low	Low Probability
Score	2	3	5	1	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Low Negative Impact (24)		Low Negative Impact (22)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • A pre-construction archaeological walkdown survey of the final WEF layout is recommended. • In the event of archaeological resources being encountered during the course of development, work within 50 m of the find must be halted and the find reported to the ECO. The ECO must inform HWC so that mitigatory action can be determined and be implemented if necessary. The find may require inspection or collection/excavation by an archaeologist. • Should human remains be encountered, activities work in the vicinity of the find must cease, the remains must be left in situ but made secure and HWC must be notified immediately so that mitigatory action can be determined and be implemented.					
Residual impact	If mitigation measures are followed there should be no residual impact.				

Impacts to the cultural landscape arising from construction of the Hugo WEF in a rural area with identified scenic value are potentially high negative. This may be reduced to moderate negative if suitable measures to mitigate the intrusion of WEF infrastructure and activities associated with the project in the landscape can be implemented.

Impact Phase: Construction, Operation and Decommissioning					
Nature of the impact: Disruption of the cultural landscape due to the presence of construction equipment and activity					
Description of Impact: Disruptions to views and sense of place resulting from the construction activities, and the introduction of WEF infrastructure into the landscape.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long-term	Irreversible	High	Definite
Score	2	4	5	4	5
With Mitigation	Local	Long-term	Recoverable	Moderate	Definite
Score	2	4	3	3	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (75)		Moderate Negative Impact (60)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce risk: • Keep the construction and decommissioning duration as short as possible and as much of the activity as possible out of the public view. • In particular the infrastructure area(s) should be screened if possible, and noise and light pollution kept to a minimum. • Decommissioning - Ensure effective rehabilitation of all areas following advice of the relevant specialist.					
Residual impact	None				

10.9 PALEONTOLOGY

The construction phase of the proposed WEF will entail extensive surface clearance (e.g. for internal roads, WTG and construction laydown areas) as well as excavations into the superficial sediment cover and underlying bedrock (e.g. for wind turbine foundations). These activities have the potential to directly impact fossiliferous rocks and any fossil material they contain.

10.9.1 CONSTRUCTION PHASE

Impact Phase: Construction					
Nature of the impact: Disturbance or destruction of fossil material					
Description of Impact: Disturbance or destruction of paleontological material resulting from earthworks and excavations associated with the construction of the WEF, particularly (but not exclusively) excavations for foundations for WTGs.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Permanent	Irreversible	Low	Low Probability
Score	2	3	5	2	2
With Mitigation	Local	Permanent	Irreversible	Very Low	Low Probability
Score	2	3	5	1	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Low Negative Impact (22)		Low Negative Impact (22)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce risk or enhance opportunities:
- The ECO must be informed of the very high paleontological significance of the WEF area;
- The Fossil Chance Find Protocol contained in Volume II, which is designed to record all unexpected fossils associated with the geological formations on site must:
  - be implemented during the construction WEF, and
  - be included as part of the EMPr for this project.
- If fossils are exposed during construction they should be rescued and a palaeontologist called to assess and collect a representative sample, unless HWC recommends an alternative approach; and
- Recommendations contained in the PIA must be approved by HWC for inclusion in the EMPr for the project.

Residual impact	None

10.10 VISUAL/LANDSCAPE

10.10.1 CONSTRUCTION

During the construction period it is expected that any visual impact of concern on sensitive visual receptors within the study area will be temporary and limited to a short-term period (approx. 2 years). The below direct construction visual impacts of the proposed Hugo Wind Energy Facility are assessed as follows:

Impact Phase: Construction					
Nature of the impact: Visual impact of construction activities on residents of homesteads and visitors to tourist accommodation within 5 km to the proposed WEF.					
Description of Impact: During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to landowners in the area within 5km from the proposed site. Additionally, dust as a result of the construction activities and construction equipment (i.e. cranes), temporary laydown areas, construction camps, etc. may also be visible at the site, resulting in a visual impact occurring during construction. Sensitive receptors in this zone consist of residents of various homesteads such as Uitsig as well as tourist accommodation offerings (Middelberg, Ezelszacht etc).					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Short term	Reversible	Very high	Highly Probable
Score	4	2	1	10	4
With Mitigation	Very Short distance	Short term	Reversible	High	Probable
Score	4	2	1	8	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Moderate Negative Impact (48)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes – photosimulations were undertaken at various nearby receptors				

Mitigation:

Planning:

- Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site.

Construction:

- Ensure that vegetation is not unnecessarily removed during the construction period.
- Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
- Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual impact	None, provided that rehabilitation works are carried out as required.

Impact Phase: Construction					
Nature of the impact: Visual impact of construction activities on observers travelling along roads within 5 km of the proposed WEF.					
Description of Impact: During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and in the area within 5km from the proposed site. Additionally, dust as a result of the construction activities and construction equipment (i.e. cranes), temporary laydown areas, construction camps, etc. may also be visible at the site, resulting in a visual impact occurring during construction. Sensitive receptors in this zone consist of observers travelling along the R318 which cuts through the site and the N1 located to the north.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Short term	Reversible	Very high	Highly Probable
Score	4	2	1	10	4
With Mitigation	Very Short distance	Short term	Reversible	High	Probable
Score	4	2	1	8	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (60)		Moderate Negative Impact (42)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Planning:

- Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site.

Construction:

- Ensure that vegetation is not unnecessarily removed during the construction period.
- Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
- Rehabilitate all disturbed areas immediately after the completion of construction works.

Impact Phase: Construction	
Residual impact	None, provided that rehabilitation works are carried out as required.

10.10.2 OPERATION

During the operational phase of the proposed Hugo Wind Energy Facility, it is generally accepted that the wind turbine structures associated with the proposed facility will constitute the largest visual impact of concern on sensitive visual receptors within the study area, as a result of their sheer scale in relation to other proposed infrastructure that may be located on the site. The below direct operational visual impacts of the proposed Hugo Wind Energy Facility are assessed as follows:

Impact Phase: Operation					
Nature of the impact: Visual impact on residents of homesteads and visitors to tourist accommodation within 5 km to the proposed WEF.					
Description of Impact: The operation of the Hugo Wind Energy Facility is expected to have a very high visual impact (significance rating = 90) on observers/visitors residing at homesteads and tourist accommodation facilities within a 5km radius of the wind turbine structures.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Long term	Reversible	Very high	Definite
Score	4	4	1	10	5
With Mitigation	Very Short distance	Long term	Reversible	Very high	Definite
Score	4	4	1	10	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Very High Negative Impact (90)		Very High Negative Impact (90)		
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				

Mitigation:

<u>Planning:</u>

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Impact Phase: Operation	
Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation					
Nature of the impact: Visual impact on observers travelling along the roads within 5 km to the proposed WEF.					
Description of Impact: During the entire operational lifespan of the Hugo Wind Energy Facility, it is expected that daily commuters and possible tourists travelling along the various roads within 5km of the wind turbine structures may be negatively impacted upon by the visual exposure to the proposed infrastructure, however brief. It is assumed that the observers travelling along these roads will view the visual intrusion of the turbines in a negative light when compared with the rural and scenic quality of the surrounding landscape.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Long term	Reversible	Very high	Definite
Score	4	4	1	10	5
With Mitigation	Very Short distance	Long term	Reversible	Very high	Definite
Score	4	4	1	10	5
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	High Negative Impact (80)			High Negative Impact (80)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation: Planning: • Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.					

Impact Phase: Operation	
Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation					
Nature of Impact: Visual impact on residents of homesteads and visitors to tourist accommodation within 5-10 km to the proposed WEF.					
Description of Impact: The Hugo Wind Energy Facility could have a very high visual impact (significance rating = 82) on residents of (or visitors to) homesteads and tourist accommodation within a 5 - 10km radius of the wind turbine structures.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Short distance	Long term	Reversible	High	Definite
Score	3	4	1	8	5
With Mitigation	Short distance	Long term	Reversible	High	Definite
Score	3	4	1	8	5
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Very High Negative Impact (82)			Very High Negative Impact (82)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				
Mitigation: Planning: • Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.					

Impact Phase: Operation	
Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation					
Nature of Impact: Visual impact on observers travelling along roads within 5-10 km to the proposed WEF.					
Description of Impact: The Hugo Wind Energy Facility could have a high visual impact (significance rating = 72) on observers travelling along the R318 and N1 within a 5 - 10km radius of the wind turbine structures.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Short distance	Long term	Reversible	High	Definite
Score	3	4	1	8	5
With Mitigation	Short distance	Long term	Reversible	High	Definite
Score	3	4	1	8	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (72)		High Negative Impact (72)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation: Planning: • Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: • Maintain the general appearance of the facility as a whole.					

Impact Phase: Operation

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact on observers travelling along roads within 5-10 km to the proposed WEF.

Description of Impact:
The Hugo Wind Energy Facility could have a high visual impact (significance rating = 87) on observers travelling along the R318 and N1 within a 5 - 10km radius of the wind turbine structures.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Short distance	Long term	Reversible	Very High	Definite
Score	3	4	1	10	5
With Mitigation	Short distance	Long term	Reversible	Very High	Definite
Score	3	4	1	10	5
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Very High Negative Impact (87)			Very High Negative Impact (87)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.

Impact Phase: Operation	
• Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact on residents of homesteads and visitors to tourist accommodation within 10-20 km to the proposed WEF.

Description of Impact:
The Hugo Wind Energy Facility could have a moderate visual impact (significance rating = 56) on residents of (or visitors to) homesteads/tourist accommodation within a 10 - 20km radius of the wind turbine structures.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Medium distance	Long term	Reversible	Moderate	Highly Probable
Score	2	4	1	6	4
With Mitigation	Medium distance	Long term	Reversible	Moderate	Highly Probable
Score	2	4	1	6	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (56)			Moderate Negative Impact (56)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Impact Phase: Operation	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact on observers travelling along roads within 10-20 km to the proposed WEF.

Description of Impact:
The Hugo Wind Energy Facility could have a moderate visual impact (significance rating = 39) on observers travelling along roads within a 10 - 20km radius of the wind turbine structures.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Medium distance	Long term	Reversible	Moderate	Probable
Score	2	4	1	6	3
With Mitigation	Medium distance	Long term	Reversible	Moderate	Probable
Score	2	4	1	6	3

Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	Moderate Negative Impact (39)	Moderate Negative Impact (39)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Impact Phase: Operation	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact on visitors to formally protected areas and private nature reserves within 10-20 km to the proposed WEF.

Description of Impact:
The Hugo Wind Energy Facility could have a moderate visual impact (significance rating = 60) on visitors/ tourists to the Drie Kuilen Private Nature Reserve (formally protected area) and the proposed Exemia PNR (non-designated), located within a 10 - 20km radius of the wind turbine structures.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Medium distance	Long term	Reversible	Moderate	Highly Probable
Score	2	4	1	6	4
With Mitigation	Medium distance	Long term	Reversible	Moderate	Highly Probable
Score	2	4	1	6	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (60)			Moderate Negative Impact (60)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Impact Phase: Operation	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact of shadow flicker on sensitive visual receptors in close proximity to the proposed WEF.

Description of Impact:

This study found that three (3) turbines labelled WTG38, 15 and 18 are likely to have a shadow flicker impact on motorists using the R318 arterial road. It is, however, expected that the number of motorists travelling on these roads will be limited and the level of exposure will be brief, thereby, not constituting a shadow flicker visual impact of concern for these receptors.

Four (4) turbines labelled WTG32, 18 and 17 and 16, may have a shadow flicker impact on Nadini, Vredelus and an unknown homestead respectively. All of these homesteads appear to be located within the farm portions earmarked for the proposed WEF development and may pose a shadow flicker visual impact of concern.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Long term	Reversible	Moderate	Probable
Score	4	4	1	6	3
With Mitigation	Medium distance	Long term	Reversible	Moderate	Probable
Score	2	4	1	6	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (48)			Moderate Negative Impact (48)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Impact Phase: Operation

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact of lighting at night on residents and visitors to homesteads and tourist accommodation within 10 km from the proposed WEF

Description of Impact:
The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in the study area, especially those located in closer proximity to the wind turbine structures especially within 0-5km and potentially up to 20km.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Short to medium distance	Long term	Reversible	High	Definite
Score	3	4	1	8	5
With Mitigation	Very Short distance	Long term	Reversible	Moderate	Highly Probable
Score	3	4	1	6	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Very High Negative Impact (82)		High Negative Impact (64)		
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Impact Phase: Operation	
Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation					
Nature of Impact: Visual impact of lighting at night on observers travelling along roads within 10 km from the proposed WEF					
Description of Impact: The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in the study area, especially those located in closer proximity to the wind turbine structures especially within 0-5km and potentially up to 20km.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Short to medium distance	Long term	Reversible	Moderate	Definite
Score	3	4	1	6	5
With Mitigation	Very Short distance	Long term	Reversible	Moderate	Highly Probable
Score	3	4	1	6	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	High Negative Impact (72)			Moderate Negative Impact (54)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				
Mitigation: Planning:					

Impact Phase: Operation

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: Visual impact of the ancillary infrastructure on residents of nearby homesteads

Description of Impact:
On-site ancillary infrastructure associated with the WEF includes a 132kV substation and collector substation, BESS, underground cabling between the wind turbines, internal access roads, gate house, Operation and Maintenance buildings. No dedicated viewshed analyses have been generated for the ancillary infrastructure, as the range of visual exposure will fall within (and be overshadowed by) that of the turbines.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Long term	Reversible	High	Highly Probable
Score	4	4	1	8	4
With Mitigation	Very Short distance	Long term	Reversible	Moderate	Probable
Score	4	4	1	6	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	High Negative Impact (68)			Moderate Negative Impact (48)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Planning:

Impact Phase: Operation	
• Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation					
Nature of Impact: Visual impact of the ancillary infrastructure on observers travelling along the R318					
Description of Impact: On-site ancillary infrastructure associated with the WEF includes a 132kV substation and collector substation, BESS, underground cabling between the wind turbines, internal access roads, gate house, Operation and Maintenance buildings. No dedicated viewshed analyses have been generated for the ancillary infrastructure, as the range of visual exposure will fall within (and be overshadowed by) that of the turbines. The anticipated visual impact resulting from this infrastructure is likely to be of moderate significance post mitigation. It should be noted that the preferred alternative for the substation would have a lower significance rating owing to the greater distance from the R318 and the closest homestead.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Very Short distance	Long term	Reversible	High	Definite
Score	4	4	1	8	5
With Mitigation	Very Short distance	Long term	Reversible	Moderate	Highly Probable
Score	4	4	1	6	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	High Negative Impact (75)			Moderate Negative Impact (56)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Impact Phase: Operation

Mitigation:

Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operation

Nature of Impact: The potential impact on the sense of place of the region.

Description of Impact:
The greater environment has a rural, undeveloped character and a natural appearance. These generally undeveloped landscapes are considered to have a high visual quality. The landscape sensitivity is considered to be high whereby it has limited to low capacity to accommodate/absorb any change, which in this case would be the proposed wind turbines.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Long distance	Long term	Reversible	Very High	Definite
Score	1	4	1	10	5
With Mitigation	Long distance	Long term	Reversible	High	Definite
Score	1	4	1	8	5
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Very High Negative Impact (82)			Very High Negative Impact (82)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation:

Impact Phase: Operation	
Planning: • Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: • Maintain the general appearance of the facility as a whole. Decommissioning: • Remove infrastructure not required for the post-decommissioning use. • Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

10.11 NOISE

Increased noise levels are directly linked with the various activities associated with the construction of the proposed development, as well as the operation phase of the activity. In South Africa the document that addresses the issues concerning environmental noise is SANS 10103. It provides the maximum average ambient noise levels, LReq,d and LReq,n, during the day and night respectively to which different types of developments may be exposed. For rural areas the Zone Sound Levels (Rating Levels) are:

- Day (06:00 to 22:00) - LReq,d = 45 dBA, and
- Night (22:00 to 06:00) - LReq,n = 35 dBA.

10.11.1 CONSTRUCTION PHASE

A potential significant source of noise during the construction phase is additional traffic to and from the site, as well as traffic on the site. The use of a borrow pit(s), on site crushing and screening and concrete batching plants will significantly reduce heavy vehicle movement to and from the site. Construction traffic is expected to be generated throughout the entire construction period, expected to take approximately 18 – 24 months, however, the volume and type of traffic generated will be dependent upon the construction activities being conducted, which will vary during the construction period. Noise levels due to traffic can be estimated using various different noise algorithms.

Impact Phase: Construction Phase
Nature of the impact: Construction of access roads
Description of Impact: Daytime ambient sound levels could range from less than 20 dBA to more than 75 dBA, averaging at 43.7 dBA (for the six measurement locations). Daytime ambient sound levels are thus typical of a rural noise district. Construction noises might be audible over large distances during quiet periods (during low wind conditions. Worst-case noise level of 50.7 (NSR H-13) to 35.6 dBA (NSR H-6). Daytime construction activities should not change the existing rating levels, with this report recommending a daytime noise limit of 52 dBA. The projected noise levels, the change in

Impact Phase: Construction Phase					
ambient sound levels as well as the potential noise impact is defined per NSR in Volume II, Appendix E, Table 2 and summarized below.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Temporary	High	High	Likely
Score	2	1	N/A	8	3
With Mitigation	Local	Temporary	High	Moderate	Possible
Score	2	1	N/A	6	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Medium Negative Impact (33)			Low Negative Impact (18)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: • The applicant can discuss the potential noise levels with NSR H-13 (very temporary residential use, located 1,094 m from closest WTG), highlighting the temporary nature of the noise impact. • The applicant can plan for construction activities past NSR H-13 when the dwelling is not used for residential purposes.					
Residual impact	None				

Impact Phase: Construction Phase					
Nature of the impact: Construction traffic noise					
Description of Impact: Daytime ambient sound levels could range from less than 20 dBA to more than 75 dBA, averaging at 43.7 dBA (for the six measurement locations). Daytime ambient sound levels are thus typical of a rural noise district. Construction traffic passing NSR might be audible over large distances during quiet periods (during low wind conditions) Worst-case noise level of 45.3 (H-10) to 34.5 dBA (H-6). As mentioned above, a daytime noise limit of 52 dBA is recommended. The projected noise levels, the change in ambient sound levels as well as the potential noise impact is defined per NSR in Volume II, Appendix E, Table 3 and summarized below.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability

Impact Phase: Construction Phase					
Without Mitigation	Local	Short-term	High	Low	Possible
Score	2	2	N/A	4	2
With Mitigation	Local	Short-term	High	Low	Possible
Score	2	2	N/A	4	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Low Negative Impact (16)			Low Negative Impact (16)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: • The noise levels associated with construction traffic will be temporary to short-term, will have a minor to low influence on ambient sound levels at the various NSR and will be of a low significance. Additional mitigation is therefore not required.					
Residual impact	None				

Impact Phase: Construction Phase					
Nature of the impact: Daytime construction activities					
Description of Impact: Daytime ambient sound levels could range from less than 20 dBA to more than 75 dBA, averaging at 43.7 dBA (for the six measurement locations). Daytime ambient sound levels are thus typical of a rural noise district. Construction activities might be audible over large distances during quiet periods (during low wind conditions) Worst-case noise level of 44.6 (NSR H-6) to 21.4 dBA (NSR H-12). As mentioned above, a daytime noise limit of 52 dBA is recommended. The projected noise levels, the change in ambient sound levels as well as the potential noise impact is defined per NSR in Volume II, Appendix E, Table 4 and summarized below.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short-term	High	Low	Improbable
Score	2	2	N/A	10	1
With Mitigation	Local	Short-term	High	Low	Improbable
Score	2	2	N/A	8	1
Significance Calculation	**Without Mitigation**			**With Mitigation**	

Impact Phase: Construction Phase		
S=(E+D+R+M)*P	Low Negative Impact (8)	Low Negative Impact (8)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	
Mitigation measures to enhance opportunities: • Potential significance of impact is low, albeit worst case scenario considered with numerous simultaneous construction activities taking place during the day. Additional mitigation therefore not required.		
Residual impact	None	

Impact Phase: Construction Phase					
Nature of the impact: Night-time construction activities					
Description of Impact: Night-time ambient sound levels could range from less than 20 to more than 75 dBA, averaging at 33.1 dBA (for the six measurement locations). Night-time ambient sound levels are typical of a rural noise district and introduced noises could be clearly audible during quiet periods (during no or low wind conditions) Worst-case noise level of 44.6 (NSR H-6) to 21.4 dBA (NSR H-12). As mentioned above, a daytime noise limit of 52 dBA is recommended. The projected noise levels, the change in ambient sound levels as well as the potential noise impact is defined per NSR in Volume II, Appendix E, Table 5 and summarized below.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Short-term	High	Very High	Likely
Score	3	2	N/A	10	3
With Mitigation	Regional	Short-term	High	High	Possible
Score	3	2	N/A	8	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Medium Negative Impact (45)		Low Negative Impact (26)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Impact Phase: Construction Phase	
The potential significance of noise impact due to night-time construction activities at night will be medium at NSR H-6. Mitigation measures to enhance opportunities: • It is recommended that, when construction activities are required closer than 1,000m from an NSR, the applicant should: • Plan construction schedule that such simultaneous activities are only required at one WTG location (WTG located within 1,000m from an NSR). Other simultaneous construction activities can continue, but should take place further than 1,000m from NSR. • Warning NSR of when construction activities may take place at night. • Minimise active equipment at night, planning the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period.	
Residual impact	None

10.11.2 OPERATION PHASE

The proposed development would be designed to have an operational life of up to 25 years with the possibility to further expand the lifetime of the WEF. The only development related activities on-site will be routine servicing (access roads and light traffic) and unscheduled maintenance. The noise impact from maintenance activities is insignificant, with the main noise source being the wind turbine blades and the nacelle (components inside). Noise emitted by wind turbines can be associated with two types of noise sources. These are aerodynamic sources due to the passage of air over the wind turbine blades and mechanical sources which are associated with components of the power train within the turbine, such as the gearbox and generator and control equipment for yaw, blade pitch, etc. These sources normally have different characteristics and can be considered separately. In addition, there are other noise sources of lower levels, such as the substations and traffic (maintenance). Although considered rare, there is one other characteristic of wind turbine sound that increases the sleep disturbance potential above that of other long-term noise sources. The amplitude modulation (AM) of the sound emissions from the wind turbines creates a repetitive rise and fall in sound levels synchronized to the blade rotation speed, sometimes referred to as a “swish” or “thump”. Even though there are thousands of wind turbine generators in the world, AM is still a subject receiving very few complaints. The lack of complaints has resulted in little research being conducted on this subject and it is not possible to predict whether AM may occur, nor to calculate the potential related impact.

Impact Phase: Operation Phase
Nature of the impact: Daytime operation activities
Description of Impact: WTG will only operate during period with increased winds, when ambient sound levels could be higher than periods with no or low winds. Worst-case noise level of 43.7 (NSR H-6) to 23.7 dBA (NSR H-12). This assessment recommends a daytime upper noise limit of 52 dBA.

Impact Phase: Operation Phase

The projected noise levels and the change in ambient sound levels is defined for the identified NSR in Volume II, Appendix E, Table 6 and summarized below.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long-term	High	Low	Improbable
Score	2	4	N/A	4	1
With Mitigation	Local	Long-term	High	Low	Improbable
Score	2	4	N/A	4	1
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Low Negative Impact (10)			Low Negative Impact (10)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to enhance opportunities:

- The potential significance for daytime operational activities is low and additional mitigation are not required or recommended for daytime operational activities.

Residual impact	None

Impact Phase: Operation Phase

Nature of the impact: Night-time operation activities

Description of Impact: WTG will only operate during period with increased winds, when ambient sound levels are higher than periods with no or low winds.

Worst-case noise level of 43.7 (NSR H-6) to 23.7 dBA (NSR H-12).

The projected noise levels, the potential change in ambient sound levels as well as the potential noise impact is defined per NSR in Volume II, Appendix E, Table 7.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Long-term	High	Low	Possible
Score	3	4	N/A	4	2
With Mitigation	Regional	Long-term	High	Low	Possible
Score	3	4	N/A	4	2

Impact Phase: Operation Phase		
Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	Low Negative Impact (22)	Low Negative Impact (22)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	
Mitigation measures to enhance opportunities: • The potential significance for night-time operational activities is low and additional mitigation are not required or recommended for night-time operational activities. Operational WTG will be clearly audible at NSR H-6 (permanent residential use, located 750 m from closest WTG).		
Residual impact	None	

10.12 SOCIO-ECONOMIC

10.12.1 CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.
- Potential positive impacts
- Creation of employment and business opportunities.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.

- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

Impact Phase: Construction Phase					
Nature of the impact: Creation of employment and business opportunities					
Description of Impact: 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 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. The total wage bill will be in the region of R 30 million (2024 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.					
Impact Status: Positive					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local - Regional	Short term	n/a	Moderate	Probable
Score	2	2		6	3
With Mitigation / Enhancement	Local - Regional	Short term	n/a	Moderate	Highly probable
Score	3	2		6	4
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate Positive Impact (30)			Moderate Positive Impact (44)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

Employment

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, most skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
- Before the construction phase commences the proponent should meet with representatives from the BVM to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase.

Impact Phase: Construction Phase	
• The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. • Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. **Business** • The proponent should liaise with the local municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.	
Residual impact	Improved pool of skills and experience in the local area.

Impact Phase: Construction Phase
Nature of the impact: Potential impacts on family structures and social networks associated with the presence of construction workers
Description of Impact: • 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. Workers are likely to be accommodated in nearby towns of Touws River and De Doorns. As indicated above, 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. However, as indicated above, the availability of suitably qualified workers in the area is likely to be limited. There is therefore likely to be a need to use construction workers from outside the area. Accommodating these workers in Touws River and De Doorns will pose a potential risk to the local community. While the risks associated with construction workers at a community level are likely to be low with mitigation, at an individual and family level they may be significant, especially in the case of contracting a sexually transmitted disease or an unplanned pregnancy. However, given the nature of construction projects, it is not possible to totally avoid these potential impacts at an individual or family level.

Impact Phase: Construction Phase					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Irreversible – in the case of HIV and AIDS	Moderate	Probable
Score	2	2		6	3
With Mitigation / Enhancement	Local	Short term	Irreversible – in the case of HIV and AIDS	Moderate	Probable
Score	1	2		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (30)			Low Negative Impact (21)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- The proponent, in consultation with the local municipality should investigate the option of establishing a Monitoring Committee (MC) to monitor and identify potential problems that may arise during the construction phase.
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report and resolve incidents.
- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.
- The proponent and the contractor should implement an HIV/AIDS and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.
- The contractor should provide transport for workers to and from the site daily. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Impact Phase: Construction Phase	
Residual impact	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Impact Phase: Construction Phase

Nature of the impact: Potential impacts on family structures, social networks and community services associated with the influx of job seekers

Description of Impact:
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. 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.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Irreversible – in the case of HIV and AIDS	Low	Probable
Score	2	2		2	3
With Mitigation / Enhancement	Local	Short term	Irreversible – in the case of HIV and AIDS	Low	Probable
Score	1	2		2	3
Significance Calculation	**Without Mitigation**		**With Mitigation / Enhancement**		
S=(E+D+R+M)*P	Low Negative Impact (18)		Low Negative Impact (15)		
Was public comment received?	No				
Has public comment been included in	No				

Impact Phase: Construction Phase	
mitigation measures?	

Mitigation measures reduce residual risk or enhance opportunities:

It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area. In addition:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- Where reasonable and practical, the proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.
- The proponent should implement a policy that no employment will be available at the gate.
- The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.

Residual impact	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Impact Phase: Construction Phase

Nature of the impact: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site.

Description of Impact:
The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers 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 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. Based on feedback from interviews with local landowners, stock theft was identified as a key concern.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Reversible – with compensation	Moderate	Probable
Score	3	2		6	3
With Mitigation / Enhancement	Local	Short term	Reversible – with compensation	Low	Probable
Score	2	2		4	3

Significance Calculation	**Without Mitigation**	**With Mitigation / Enhancement**
S=(E+D+R+M)*P	Moderate Negative Impact (33)	Low Negative Impact (24)

Impact Phase: Construction Phase	
Was public comment received?	No
Has public comment been included in mitigation measures?	No

Mitigation measures reduce residual risk or enhance opportunities:

- Where reasonable and practical, the proponent should enter into an agreement with the affected local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- The developer(s) and local farming community should co-ordinate (and if necessary, upgrade) security arrangements, such as establishment of security cameras at strategic locations.
- All farm gates must be closed after passing through.
- Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
- Where reasonable and practical, the proponent should consider the option of establishing a MC that includes local farmers and develop a Code of Conduct for construction workers. The MC should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before construction activities commence.
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities.
- The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
- Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Residual impact	No, provided losses are compensated.

Impact Phase: Construction Phase

Nature of the impact: Potential noise, dust and safety impacts associated with construction related activities.

Description of Impact:
The construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The impacts will be largely local and can be effectively mitigated. The number of potentially sensitive social receptors, such as farmsteads, will also be low due to the sparse settlement patterns and small number of farmsteads in the area.

Impact Status: Negative

Impact Phase: Construction Phase					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Reversible	Moderate	Probable
Score	2	2		6	3
With Mitigation / Enhancement	Local	Short term	n/a	Minor	Probable
Score	1	2		2	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (30)			Low Negative Impact (15)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- Timing of transport of wind turbine components to the site along the N1 and R318 should be timed to avoid / reduce the impact on other road users. This includes avoiding weekends and holiday periods.
- The movement of construction vehicles on the site should be confined to existing and agreed access road/s.
- Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.
- Damage to the R318 and internal farm roads that is attributed to the WEF should be repaired before the commissioning of the WEF.
- Dust suppression measures should be implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

Residual impact	If damage to local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.

Impact Phase: Construction Phase

Nature of the impact: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires

Description of Impact:
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).

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability

Impact Phase: Construction Phase					
Without Mitigation	Local	Short term	Reversible - compensation paid for stock and crop losses etc.	Moderate	Probable
Score	4	2		6	3
With Mitigation / Enhancement	Local	Short term	n/a	Low	Probable
Score	2	2		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (36)			Low Negative Impact (24)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- Where reasonable and practical, the proponent should enter into an agreement with the affected local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Smoking on site should be confined to designated areas.
- Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months.
- Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.
- Contractor should provide fire-fighting training to selected construction staff.
- No construction staff, with the exception of security staff, to be accommodated on site overnight.
- As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors should compensate farmers for damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.

Residual impact	No, provided losses are compensated for.

Impact Phase: Construction Phase
Nature of the impact: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.

Impact Phase: Construction Phase					
Description of Impact: 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.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term-permanent if disturbed areas are not effectively rehabilitated	Reversible	Moderate	Probable
Score	1	5		6	3
With Mitigation / Enhancement	Local	Short term if damaged areas are rehabilitated	Reversible	Low	Probable
Score	1	2		2	4
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (36)			Low Negative Impact (20)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- An ECO should be appointed to monitor the construction phase.
- Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on completion of the construction phase.
- The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised.
- All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase.
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMPr.
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

Residual impact	Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.

10.12.2 OPERATION PHASE

The following key social issues are of relevance to the operational phase:

10.12.2.1 POTENTIAL POSITIVE IMPACTS

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

10.12.2.2 POTENTIAL NEGATIVE IMPACTS

- Visual impacts and associated impacts on sense of place.
- Impact on property values.
- Impact on tourism.

Impact Phase: Operation Phase
Nature of the impact: Development of infrastructure to improve energy security and support the renewable sector.
Description of Impact: 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 the majority of its energy needs, and secondly, within the context of the success of the REIPPPP. **Improved energy security** South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators. Energy expert, Chris Yelland, has estimated the cost of Stage 1 load shedding resulting in 10 hours of blackouts per day for 20 days a month results in losses of R20 billion per month. Based on this Stage 2 load shedding costs the economy R40 billion per month and Stage 3 is estimated to cost the South African economy R80 billion per month. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period. **Impact of a coal powered economy** The Green Jobs study (2011) notes that South Africa has one of the most carbon-intensive economies in the world, thus making the greening of the electricity mix a national imperative. The study notes that renewable energy provides an ideal means for reaching emission reduction targets in a relatively easy manner. In addition, and of specific relevance to South Africa renewable energy is not as dependent on water compared to the massive water requirements of conventional power stations, has a limited footprint and therefore does not impact on large tracts of land, poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants. The Greenpeace Report (powering the future: Renewable Energy Roll-out in South Africa, 2013), also notes that within a broader context of climate change, coal energy does not only have

Impact Phase: Operation Phase

environmental impacts, it also has socio-economic impacts. These include acid mine drainage from abandoned mines in South Africa and the risk this poses on the country's limited water resources.

Benefits associated with REIPPPP
Through the competitive bidding process, the IPPPP has effectively leveraged rapid, global technology developments and price trends, buying clean energy at lower and lower rates with every bid cycle, resulting in SA getting the benefit of renewable energy at some of the lowest tariffs in the world. The price for wind power has dropped by 50% to R0.94/kWh, while solar PV has dropped with 75% to R1.14/kWh between BW1 and BW4.

Prices contracted under the REIPPPP for all technologies are well below the published REFIT prices. The REIPPPP has effectively translated policy and planning into delivery of clean energy at very competitive prices. As such it is contributing to the national aspirations of secure, affordable energy, lower carbon intensity and a transformed 'green' economy.

Impact Status: Positive

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local, Regional and National	Long term	Reversible	High	Highly Probable
Score	4	4		8	4
With Mitigation / Enhancement	Local, Regional and National	Long term	n/a	High	Definite
Score	5	4		8	5
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	High Positive Impact (64)			High Positive Impact (85)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members.
- Maximise opportunities for local content, procurement, and community shareholding.

Residual impact	Overall reduction in CO_2 emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Western Cape and South Africa.

Impact Phase: Operation Phase					
Nature of the impact: Creation of employment and business opportunities associated with the operational phase					
Description of Impact: 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.					
Impact Status: Positive					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local and Regional	Long term	n/a	Minor	Highly Probable
Score	1	4		2	4
With Mitigation / Enhancement	Local and Regional	Long term	n/a	Low	Highly Probable
Score	2	4		4	4
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Positive Impact (28)			Medium Positive Impact (40)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

Employment

- Where reasonable and practical, the proponent should implement a 'locals first' policy, especially for semi and low-skilled job categories.
- Where feasible, training and skills development programmes for locals should be initiated as part of the operational phase. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the BVM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers for the operational phase.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the operational phase.

Residual impact	Creation of permanent employment and skills development opportunities for members from the local community and creation of additional business and economic opportunities in the area.

Impact Phase: Operation Phase					
Nature of the impact: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.					
Description of Impact: 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.					
Impact Status: Positive					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Reversible	Low	Probable
Score	1	4		4	3
With Mitigation / Enhancement	Local	Long term	Reversible	Moderate	Definite
Score	3	4		6	5
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Positive Impact (27)			High Positive Impact (65)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Implement agreements with affected landowners.					
Residual impact	Support for local agricultural sector and farming				

Impact Phase: Operation Phase
Nature of the impact: Benefits associated with support for local community's form SED contributions.
Description of Impact: 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

Impact Phase: Operation Phase
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 a number of social and economic initiatives in the area, including: • Creation of jobs. • Education. • Support for and provision of basic services. • School feeding schemes. • Training and skills development. • Support for 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.
Impact Status: Positive

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local and regional	Long term	Reversible	Low	Probable
Score	2	4		4	3
With Mitigation / Enhancement	Local and regional	Long term	Reversible	Moderate	Definite
Score	3	4		6	5

Significance Calculation	Without Mitigation	With Mitigation / Enhancement
S=(E+D+R+M)*P	Moderate Positive Impact (30)	High Positive Impact (65)
Was public comment received?	No	
Has public comment been included in mitigation measures?	No	

Mitigation measures reduce residual risk or enhance opportunities:

- The proponents should liaise with the BVM to identify projects that can be supported by SED contributions.
- Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.
- Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.

Impact Phase: Operation Phase	
Residual impact	Promotion of social and economic development and improvement in the overall well-being of the community.

Impact Phase: Operational Phase

Nature of the impact: The potential impact on the sense of place of the region.

Description of Impact:
The VIA notes that sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), play a significant role. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Based on the findings of the VIA the significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of very high significance. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Long distance	Long term	Reversible	Very High	Definite
Score	1	4	1	10	5
With Mitigation / Enhancement	Long distance	Long term	Reversible	Very High	Definite
Score	1	4	1	10	5
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Very High Negative Impact (82)			Very High Negative Impact (82)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				

Mitigation measures reduce residual risk or enhance opportunities:
Planning:

- Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

- Maintain the general appearance of the facility as a whole.

Impact Phase: Operational Phase

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Impact Phase: Operational Phase

Nature of the impact: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place.

Description of Impact:
While the VIA assumes in its approach that most observers would be predominantly negative towards the development of a WEF in the region, based on the findings of this and other SIAs for wind farms, this not necessarily always the case. While some landowners and travellers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	n/a	Moderate - High	Highly Probable
Score	3	4		6	4
With Mitigation / Enhancement	Local	Long term	Reversible	Moderate - High	Highly Probable
Score	3	4	n/a	6	4
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Moderate - High Negative Impact (52)			Moderate - High Negative Impact (52)	
Was public comment received?	Yes				
Has public comment been included in mitigation measures?	Yes				

Mitigation measures reduce residual risk or enhance opportunities:
- The recommendations contained in the VIA should also be implemented.
- Install radar activated civil aviation light system.

Residual impact	Potential impact on current rural sense of place.

Impact Phase: Operational Phase					
Nature of the impact: Potential impact of the WEF on property values					
Description of Impact: 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 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 and their associated property values therefore exists.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	n/a	Moderate	Probable
Score	2	4		6	3
With Mitigation / Enhancement	Local	Long term	n/a	Low	Probable
Score	1	4		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Medium Negative Impact (36)			Low Negative Impact (27)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • The recommendations contained in the VIA should also be implemented. • The developer of the Hugo WEF should liaise with the owners of the affected operations to assess the potential impact of the WEF on property values and the option of compensation. An independent property valuator should be appointed at the cost of the developer to undertake the assessment. • Install radar activated civil aviation light system.					
Residual impact	Linked to visual impact on sense of place.				

Impact Phase: Operational Phase
Nature of the impact: Potential impact of the WEF on tourism operations that are visually impacted
Description of Impact: A Tourism Impact Assessment was undertaken by Urban Econ as part of an EIA for the Angora WEF located to the southwest of Richmond in the Northern Cape. Based on the findings of the study the impact on a tourism facility that was visually exposed to the Angora WEF was rated as Medium Negative with and without mitigation. Based on the findings of the SIA it is reasonable to assume that this rating would also apply to the properties affected by the Hugo WEF. The Hugo WEF therefore has the potential to impact negatively on existing tourism operations in the study

Impact Phase: Operational Phase

area that are visually exposed to the wind turbines. This represents a negative externality for which the owners of these facilities may potentially suffer a financial loss.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	n/a	Moderate	Probable
Score	2	4		6	3
With Mitigation / Enhancement	Local	Long term	n/a	Low	Probable
Score	1	4		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Medium Negative Impact (36)			Low Negative Impact (27)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- The recommendations contained in the VIA should be implemented.
- The developer of the Hugo WEF should liaise with the owners of the affected operations to assess the potential impact of the Hugo WEF on future tourism operations and the option of some form of compensation if a direct impact can be established. All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.

Residual impact	Linked to visual impact on sense of place.

Impact Phase: Operational Phase

Nature of the impact: Potential impact of the WEF on local tourism in the area

Description of Impact:
A Tourism Impact Assessment was undertaken by Urban Econ as part of an EIA for the Angora WEF located to the southwest of Richmond in the Northern Cape. Based on the findings of the study the impact on a tourism facility that was visually exposed to the Angora WEF was rated as Medium Negative with and without mitigation. Based on the findings of the SIA it is reasonable to assume that this rating would also apply to the properties affected by the Hugo WEF. The Hugo WEF therefore has the potential to impact negatively on existing tourism operations in the study area that are visually exposed to the wind turbines. This represents a negative externality for which the owners of these facilities may potentially suffer a financial loss.

Impact Phase: Operational Phase					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	n/a	Moderate	Probable
Score	2	4		6	3
With Mitigation / Enhancement	Local	Long term	n/a	Low	Probable
Score	1	4		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (16)			Low Negative Impact (16)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:
- The recommendations contained in the VIA should be implemented.
- The developer of the Hugo WEF should liaise with the owners of the affected operations to assess the potential impact of the Hugo WEF on future tourism operations and the option of some form of compensation if a direct impact can be established.

Residual impact	Linked to visual impact on sense of place.

10.12.3 DECOMMISSIONING PHASE

Impact Phase: Decommissioning Phase

Nature of the impact: Social impacts associated with retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact.

Description of Impact:
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 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.

Impact Phase: Decommissioning Phase					
The decommissioning phase will also create employment opportunities. This will represent a positive impact. These jobs will, however, be temporary.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	n/a	Moderate	Probable
Score	4	2		6	3
With Mitigation / Enhancement	Local	Short term	n/a	Low	Probable
Score	2	2		4	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Medium Negative Impact (36)			Low Negative Impact (24)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned. • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.					
Residual impact	No, provided effective retrenchment package.				

10.13 TRAFFIC AND TRANSPORTATION

10.13.1 CONSTRUCTION AND DECOMMISSIONING PHASE

Impact Phase: Construction/Decommissioning Phase
Nature of the impact: Increase in general peak hour traffic volumes
Description of Impact: Increased traffic on the route and access points to site - Potential to be greater than what the existing road capacity of the local road network can handle in order to operate at an acceptable level of service. This impact relates to potential disruption of traffic on local, regional and national roads. The severity of the impacts will depend on the order of the road (how many lanes, lanes width, length, turns, etc.), the receiving environment and vicinity of land uses and towns.

Impact Phase: Construction/Decommissioning Phase					
Additional traffic on the road network could result in changes to the operations of that road network, intersection capacity, such as increased congestion, delays, and accidents.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Short term	Recoverable	Low	Probable
Score	3	2	3	2	3
With Mitigation / Enhancement	Local	Short term	Reversible	Very low	Probable
Score	2	2	1	1	3
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (30)			Low Negative Impact (18)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Implementation of the Traffic Management Plan and Road Safety Measures • Limit use of private cars • Schedule development traffic movements to not coincide with existing peaks where possible • Encourage use of public/staff transportation					
Residual impact	Negative, moderate and temporary				

Impact Phase: Construction/Decommissioning Phase					
Nature of the impact: Increase in abnormal traffic volumes					
Description of Impact: Additional heavy vehicles/E80's/Abnormal vehicles on the external road network- Potential to require additional road rehabilitation. The impact of abnormal loads on public roads is expected to cause journey time delays and traffic congestion due to low travelling speeds of heavy vehicles transporting abnormal loads. These often occupy two standard traffic lanes and can potentially lead to incidents when travelling on single carriageways with a single lane per direction and without traffic police escorts.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	National	Short term	Recoverable	High	Probable

Impact Phase: Construction/Decommissioning Phase					
Score	3	2	3	4	3
With Mitigation / Enhancement	National	Short term	Recoverable	Moderate	Probable
Score	4	2	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation / Enhancement**		
S=(E+D+R+M)*P	Moderate Negative Impact (39)		Moderate Negative Impact (36)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures reduce residual risk or enhance opportunities:

- Implementation of the Traffic Management Plan and Road Safety Measures.
- Compliance to permissible heavy vehicle dimensions, permissible axle mass load on vehicles (no overloading).
- Transportation scheduling to consider the time of day when the abnormal loads would be moved.
- Other alternative modes of transportation (rail where feasible) should be considered.

Residual impact	Negative, moderate and temporary

Impact Phase: Construction/Decommissioning Phase					
Nature of the impact: Impact of dust along gravel site access roads					
Description of Impact: Heavy vehicles are expected to cause dust along unpaved access roads to the site. This can affect the air quality and visibility for nearby residents and road users. Larger vehicles generate more dust which can limit the ability of other vehicles to overtake due to poor visibility.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Immediate	Recoverable	Moderate	Probable
Score	1	1	3	3	3
With Mitigation / Enhancement	Site	Immediate	Reversible	Low	Low Probability
Score	1	1	1	2	2
Significance Calculation	**Without Mitigation**		**With Mitigation / Enhancement**		
S=(E+D+R+M)*P	Low Negative Impact (24)		Low Negative Impact (14)		
Was public comment received?	No				

Impact Phase: Construction/Decommissioning Phase	
Has public comment been included in mitigation measures?	No
Mitigation measures reduce residual risk or enhance opportunities: • Dust control measures such as regular wet grading and wetting for dust suppression to minimize the negative impact	
Residual impact	Yes, but acceptable

Impact Phase: Construction/Decommissioning Phase					
Nature of the impact: Deterioration of surrounding road network					
Description of Impact: Heavy vehicle traffic during construction of the development is expected to cause additional wear and tear on the surrounding road network. Gravel access roads to the sites are also expected to sustain damage during the construction phase of the project. Abnormal loads can exert more pressure on road surfaces and infrastructure, leading to increased maintenance costs and reduced road network lifespan.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Short term	Recoverable	Moderate	Probable
Score	2	2	3	3	3
With Mitigation / Enhancement	Site	Immediate	Reversible	Low	Low Probability
Score	1	1	1	2	2
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (30)			Low Negative Impact (10)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Limiting the number and frequency of heavy and overloaded vehicles where possible. • Undertaking regular maintenance, rehabilitation and upgrading substandard pavement conditions.					
Residual impact	Positive, roads will remain in better conditions post implementation of mitigation measures.				

10.13.2 OPERATION PHASE

Impact Phase: Operation Phase					
Nature of the impact: Increase in general peak hour traffic volumes					
Description of Impact: Increased traffic on the route and access points to site - Potential to be greater than what the existing road capacity of the local road network can handle in order to operate at an acceptable level of service. This impact relates to potential disruption of traffic on local, regional and national roads. The severity of the impacts will depend on the order of the road (how many lanes, 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, intersection capacity, such as increased congestion, delays, and accidents.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Immediate	Reversible	Very low	Low Probability
Score	1	1	1	1	2
With Mitigation / Enhancement	Site	Immediate	Reversible	Very low	Low Probability
Score	1	1	1	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (8)			Low Negative Impact (8)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Implementation of the Traffic Management Plan and Road Safety Measures. • Limit use of private cars. • Schedule development traffic movements to not coincide with existing peaks where possible. • Encourage use of public/staff transportation.					
Residual impact	Moderate and temporary.				

Impact Phase: Operation Phase					
Nature of the impact: Increase in abnormal traffic volumes					
Description of Impact: Additional heavy vehicles/E80's/Abnormal vehicles on the external road network- Potential to require additional road rehabilitation. The impact of abnormal loads on public roads is expected to cause journey time delays and traffic congestion due to low travelling speeds of heavy vehicles transporting abnormal loads. These often occupy two standard traffic lanes and can potentially lead to incidents when travelling on single carriageways with a single lane per direction and without traffic police escorts.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Immediate	Recoverable	Moderate	Probable
Score	3	1	3	3	3
With Mitigation / Enhancement	Regional	Immediate	Recoverable	Moderate	Low Probability
Score	1	1	3	3	2
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (30)			Low Negative Impact (20)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Implementation of the Traffic Management Plan and Road Safety Measures. • Compliance to permissible heavy vehicle dimensions, permissible axle mass load on vehicles (no overloading). • Transportation scheduling to consider the time of day when the abnormal loads would be moved. • Other alternative modes of transportation (rail where feasible) should be considered.					
Residual impact	Negative, moderate and temporary.				

Impact Phase: Operation Phase					
Nature of the impact: Impact of dust along gravel site access roads					
Description of Impact: Heavy vehicles are expected to cause dust along unpaved access roads to the site. This can affect the air quality and visibility for nearby residents and road users. Larger vehicles generate more dust which can limit the ability of other vehicles to overtake due to poor visibility.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Immediate	Recoverable	Low	Low Probability
Score	1	1	3	2	3
With Mitigation / Enhancement	Regional	Immediate	Reversible	Very low	Improbable
Score	1	1	1	1	1
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (10)			Low Negative Impact (4)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Dust control measures such as regular wet grading and wetting for dust suppression to minimize the negative impact.					
Residual impact	Negligible				

Impact Phase: Operation Phase					
Nature of the impact: Deterioration of surrounding road network					
Description of Impact: Heavy vehicle traffic during construction of the development is expected to cause additional wear and tear on the surrounding road network. Gravel access roads to the sites are also expected to sustain damage during the construction phase of the project. Abnormal loads can exert more pressure on road surfaces and infrastructure, leading to increased maintenance costs and reduced road network lifespan.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability

Impact Phase: Operation Phase					
Without Mitigation	Site	Immediate	Reversible	Low	Low Probability
Score	1	1	1	1	2
With Mitigation / Enhancement	Site	Immediate	Reversible	Very	Low Probability
Score	1	1	1	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation / Enhancement**	
S=(E+D+R+M)*P	Low Negative Impact (8)			Low Negative Impact (8)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures reduce residual risk or enhance opportunities: • Limiting the number and frequency of heavy and overloaded vehicles where possible. • Undertaking regular maintenance, rehabilitation and upgrading substandard pavement conditions.					
Residual impact	Negligible				

11. CUMULATIVE IMPACTS

The cumulative impact assessment considers the combined impact of renewable projects within a 30 km radius, that are in the development and operational phase. The combination of Hugo and Khoe, as well as other similar renewable energy projects, either existing or proposed, was considered to assess cumulative impacts within a 30 km radius of the proposed project. Developments considered during the assessment are named below:

- Proposed Touws River Solar Energy Facility;
- The Proposed Sanval 75 Mw Photovoltaic Solar Power Plant On Portion 6 Of The Farm Nuwerus 450 Near Worcester, Western Cape Province;
- Proposed Construction Of The 2.5 MW Photovoltaic (Pv) Solar Facility On Portion 0054 Of The Farm Osplaats 134 Near De Doorns Within The Breede Valley Local Municipality, Western Cape;
- Proposed Construction Of The 2.5 MW Photovoltaic (Pv) Solar Facility On Portion 0054 Of The Farm Osplaats 134 Near De Doorns Within The Breede Valley Local Municipality, Western Cape; and
- 75 MW Montague Road Solar PV Sef on Vredefort No. 34 Near Touws River within the Breede Valley Local Municipality in the Western Cape Province.

11.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

Note that electrical grid infrastructure projects do not contribute to a loss of agricultural land and are not therefore included in this calculation of cumulative land loss. The area of land taken out of agricultural use as a result of all the projects within a 30 km radius (total generation capacity of 761 MW) will amount to a total of approximately 473 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30 km radius (approximately 282,700 ha), this amounts to only 0.17% of the surface area. This is well within an acceptable limit in terms of loss of marginal potential agricultural land.

All the projects contributing to cumulative impact for this assessment have the same agricultural impacts in a very similar agricultural environment, and therefore the same mitigation measures apply to all.

Furthermore, it should be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

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 cumulative impact risk.

Due to all the considerations discussed above, the cumulative impact of loss of future agricultural production potential is assessed as low. It will not have an unacceptable negative impact on the agricultural production capability of the area, and it is therefore recommended, from a cumulative agricultural impact perspective, that the development be approved.

11.2 FRESHWATER AND WETLANDS (AQUATICS)

The rating below is based on the premise that important or sensitive features will be avoided by the various projects, while the mitigations proposed will ensure that the form and or function of downstream areas remain intact.

Cumulative Impact: Cumulative impacts on the aquatic resources of the area					
Description of Cumulative Impact: The rating below is based on the premise that important or sensitive features will be avoided by the various projects, while the mitigations proposed will ensure that the form and or function of downstream areas remain intact.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long Term	Irreversible	Medium	Probable
Score	2	4	5	2	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	3	1	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (39)			Low Negative Impact (14)	
Can Impacts be Enhanced?	No				
Enhancement: • The project should share roads and infrastructure where possible to reduce the overall footprint and reduce stormwater and erosion and sedimentation related impacts • The projects should collaborate with provincial roads authority to upgrade the main access routes and improve the crossings and stormwater controls					
Residual impact	Low				

11.3 TERRESTRIAL BIODIVERSITY

Solar facilities typically involve more invasive vegetation clearing compared to WEFs. Consequently, this can lead to the loss of individual Species of Conservation Concern (SCC) and increased habitat fragmentation. Habitat fragmentation can reduce habitat connectivity and lead to changes in the dispersal of species, population isolation and reduced genetic diversity within landscapes. While the broad-scale impacts on habitat are concerning, it's noteworthy that the Fynbos biome is not listed as critically endangered. However, broad scale clearing of vegetation could lead to cascading effects in flow regimes, nutrient cycling, and energy flow which ultimately results in decreased biodiversity.

Impact Phase: Operation					
Description of the Cumulative Impact: The consideration of five Solar Photovoltaic facilities within 30km of the proposed WEF brings about the potential of changes in broad-scale ecological processes brought on by vegetation clearing.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Enhancement	Regional	Long Term	Recoverable	High	Highly Probable
Score	3	4	3	4	4
With Enhancement	Regional	Long term	Recoverable	Moderate	Low Probability
Score	3	4	3	3	2
Significance Calculation	**Without Enhancement**			**With Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (56)			Low Negative Impact (26)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Developers within the area should share baseline data and operational monitoring data to Interested and Affected Parties on a quarterly basis. • All mitigations for the proposed development should be strictly adhered to avoid cumulative contributions.					
Residual impact	Proposed development unlikely to significantly contribute to broad-scale ecological impacts to flora in the area.				

11.4 FAUNA

As the proposed Khoe WEF, located approximately 8 km to the south of the proposed Hugo WEF development, was assessed concurrently by the author, the potential impacts are well understood and the cumulative impacts were considered. The contributions of the proposed developments to cumulative impacts specific to Riverine Rabbit would likely be low as the total footprint within the preferred habitats of this species would be minimal relative to the extent of habitat available.

The existing extent of cultivated land, however, remains the most notable impact in the area for animals and restricts movement across the landscape. The proposed development introduces the potential to offset some of the impacts to animal habitats imposed by vegetation clearing associated with agricultural activity and solar facilities. Agricultural activity and solar photovoltaic facilities generally require proportionally larger areas of habitat clearing compared to wind energy developments. The proposed development would not likely have a negative impact the long-term persistence or viability of local populations.

Impact Phase: Cumulative					
Description of the Cumulative impact: Contribution of the proposed development to the cumulative impacts of landcover and land-use to the long-term persistence and viability of animal SCCs in the area					
Impact Status: Negative, Positive with mitigation					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Long term	Recoverable	High	Highly Probable
Score	3	4	3	4	4
With Mitigation	Regional	Long term	Recoverable	High	Probable
Score	3	4	3	4	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative (56)			Moderate Positive (42)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to reduce residual risk or enhance opportunities: • Implement mitigation measures as detailed above					
Residual impact	Improvement in habitat connectivity for relevant animal SCCs				

11.5 FLORA

Solar facilities typically involve more invasive vegetation clearing compared to WEFs. Consequently, this can lead to the loss of individual SCC and increased habitat fragmentation. Habitat fragmentation can reduce habitat connectivity and lead to changes in the dispersal of species, population isolation and reduced genetic diversity within landscapes. While the broad-scale impacts on habitats are concerning, it's noteworthy that the Fynbos biome is not listed as critically endangered. However, broad scale clearing of vegetation could lead to cascading effects in flow regimes, nutrient cycling, and energy flow which ultimately results in decreased biodiversity.

Impact Phase: Operation
Description of the Cumulative Impact: The consideration of five Solar Photovoltaic facilities within 30km of the proposed WEF brings about the potential of changes in broad-scale ecological processes brought on by vegetation clearing.

Impact Phase: Operation					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Enhancement	Regional	Long term	Recoverable	High	Highly Probable
Score	3	4	3	4	4
With Enhancement	Regional	Long term	Recoverable	Moderate	Low Probability
Score	3	4	3	3	2
Significance Calculation	**Without Enhancement**			**With Enhancement**	
S=(E+D+R+M)*P	Moderate Negative Impact (56)			Low Negative Impact (42)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- Developers within the area should share baseline data and operational monitoring data to Interested and Affected Parties on a quarterly basis.
- All mitigations for the proposed development should be strictly adhered to avoid cumulative contributions.

Residual impact	Broad-scale changes to ecological functions are still expected.

11.6 AVIFAUNA

The estimated figure for all avian fatalities is 1,292 birds (all species) from interactions with the one wind farm (Khoe WEF) and four solar farms within 30 km. About 173 of these are expected to be raptors as victims of wind energy facilities. This does not include species that may be displaced from these developments and excludes fatalities due to power line collisions.

These are medium-high totals and suggest cumulative totals must be ranked a medium-high and significant. With CRM- based mitigations (at the Hugo and Khoe WEFs) it is likely that these totals will be lower.

Impact Phase: Cumulative Phase					
Description of the Cumulative Impact: Generally negative for birds due to direct fatalities due to collisions with spinning blades. Some species will also avoid the increased disturbance or move away as a result of habitat fragmentation or habitat destruction on site.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability

Impact Phase: Cumulative Phase					
Without Mitigation	Site	Long term	High	High	Highly likely
Score	1	4	3	5	5
With Mitigation	Regional	Long term	High	Moderate - high	Probable
Score	2	4	4	4	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Very High Negative Impact (85)		High Negative Impact (60)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to enhance opportunities:

- The Khoe wind energy facility south of Hugo has undertaken the same CRM process of avoidance of high-risk areas undertaken here for Hugo.
- All high-risk zones as delineated by any CRM should be adhered to (as outlined in this report) at both farms.
- Post-construction programmes must be conducted by an avifaunal specialist (following the Birds and Renewable Energy Specialist Group guidelines) to:

  (i) assess turbine-related fatalities; and (ii) confirm that all aspects have been appropriately handled and that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind energy facilities do not create favourable conditions for such mammals in high-risk areas.

A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site, prior to construction. This policy should form an annexure of the operational EMP for the facility. Most importantly, this policy should identify the number of bird fatalities of Priority species which will trigger an appropriate management response, and timelines for such responses. It is recommended that if 1 RD species or 2 or more LC species be killed per turbine per year then those turbines will require further mitigation.

Should the identified Priority bird species fatality thresholds be exceeded in Year 1 and 2, either (i) patterned blades to make rotors more visible; or (ii) an observer-led turbine Shutdown on Demand (SDOD) programme (or automated SDOD) must be implemented on site. The human lead programme must consist of a suitably qualified, trained, and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points (VPs) with full visible coverage of all turbine locations (typically 1 VP covering four turbines). The observers must detect incoming Priority bird species timeously, track their flights, and when adjudged to have entered a turbine proximity threshold, alert the control room to shut down the relevant turbine. A full detailed method statement or protocol must be designed by an ornithologist.

11.7 BATS

There are no approved wind farms within 30 km of the Hugo WEF, however there are some solar farms approved within this radius. Solar farms in general do not have a high impact on bats, apart from construction activities and habitat destruction. The mitigation measures will therefore be similar to that of the wind facility.

Construction

Description of the Cumulative Impact: The destruction of features that could serve as potential roosts, such as rock formations and derelict aardvark holes, and the removal of trees or the fragmentation of woody habitat which includes dense bushes in the surrounding 30 km, together with the construction activities of the wind farm.

Impact Status: Negative

	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Medium Term	Recoverable	Moderate	Definite
Score	2	3	3	3	5
With Mitigation	Local	Short Term	Recoverable	Low	Probable
Score	2	2	3	2	3
S=(E+D+R+M)* P	Moderate Negative Impact (55)		Low Negative Impact (27)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				

Mitigation measures to reduce residual risk or enhance opportunities:

- No clearance of vegetation or construction activities should take place if there is a chance of disturbing a possible bat roost. If there is uncertainty about any feature that could comprise a bat roost, a bat specialist should be contacted.
- Apart from access roads and the management building, construction activities are to be kept out of all high bat-sensitive areas as far as possible.
- Rock formations occurring along the ridge lines should be avoided during construction, as these could serve as roosting space for bats.
- Destruction of limited trees should be avoided during construction.
- Care should be taken if any dense bushes are destroyed, to make sure that there are not bat roosts in the vegetation. If bat roosts are found, a bat specialist should be contacted immediately.
- Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats.
- The ECO or a responsible appointed person or site manager should contact a bat specialist before construction commences so that they know what to look out for during construction.

Residual impact	There will be some residual impact as large areas of natural habitat will be removed, but with rehabilitation a component of this will be replaced.

11.8 HERITAGE AND ARCHAEOLOGY

Cumulative impacts to palaeontological 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 Hugo 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 palaeontological resource, and the negative effects of the folding and tectonic deformation of the bedrock formations described by Bamford (2024) and Almond (2022) means that the risk of impacts are reduced, and with mitigation, a low (negative) cumulative impact significance can be expected.

11.9 PALEONTOLOGY

Impacts to the cultural landscape are considered to be the main driver of cumulative impacts on heritage resources and could be extensive if multiple 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.

11.10 VISUAL/LANDSCAPE

Impact Phase: Decommission					
Description of the Cumulative Impact: The proposed Hugo WEF addressed in this report is one half of a larger wind energy cluster consisting of another proposed WEF to the south, namely Khoe wind energy facility. The cumulative visual impact of the proposed Hugo Wind Energy Facility, together with the proposed Khoe WEF is expected to be very high, depending on the observer's sensitivity to wind turbine structures. Owing to the sensitivity of the landscape, the high visual quality and the potential visual impacts on sensitive visual receptors, the cumulative visual impact is not considered to be within acceptable limits.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Overall impact of the proposed project considered in isolation	Medium distance	Long term	Reversible	High	Highly probable
Score	2	4	1	8	4
Cumulative impact of the Hugo and Khoe WEFs	Medium distance	Long term	Reversible	High	Definite
Score	2	4	1	8	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (64)		Very High Negative Impact (85)		

Impact Phase: Decommission	
Was public comment received?	No
Has public comment been included in mitigation measures?	No
Mitigation: NA	
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

11.11 NOISE

There is a low risk of cumulative noises from the Khoe WEF. The addition of the Hugo WEF will result in a slight increase in noise levels, with a minor cumulative effect on NSR H-1, H-2 and H-13.

Impact Phase: Cumulative Phase					
Description of the Cumulative Impact: Numerous WTG of the WEFs operating simultaneously at night will increase ambient sound levels due to air-borne noise from the WTG. Worst-case noise level of 43.7 (H-6) to 23.7 dBA (H-12).					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Long term	High	Low	Possible
Score	3	4	N/A	4	2
With Mitigation	Regional	Long term	High	Low	Possible
Score	3	4	N/A	4	2
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Low Negative Impact (22)			Low Negative Impact (22)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities:					

Impact Phase: Cumulative Phase	
• The potential significance of a cumulative noise impact is low and additional mitigation are not required or recommended.	
Residual impact	None

11.12 SOCIO-ECONOMIC

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: The proposed Hugo WEF is also one half of a larger wind energy cluster consisting of another proposed WEF to the south, namely the Khoe WEF. The cumulative visual impact of the proposed Hugo WEF, together with the proposed Khoe WEF is expected to be Very High, depending on the observer's sensitivity to wind turbine structures. The VIA notes that owing to the sensitivity of the landscape, the high visual quality and the potential visual impacts on sensitive visual receptors, the cumulative visual impact is not considered to be within acceptable limits.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Medium distance	Long term	Reversible	High	Highly probable
Score	2	4	1	8	4
With Mitigation	Medium distance	Long term	Reversible	Very High	Definite
Score	2	4	1	10	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	High Negative Impact (64)		Very High Negative Impact (85)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: N/A					
Residual impact	The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed, and the area rehabilitated. Failing this, the visual impact will remain.				

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: The establishment of renewable energy facilities and associated projects, such as the WEF, in the BVM will create employment, skills development and training opportunities, creation of downstream business opportunities.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Reversible	Low	Highly probable
Score	1	4	N/A	4	4
With Mitigation	Local and regional	Long term	Reversible	High	Highly probable
Score	3	4	N/A	8	4
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Medium Negative Impact (36)			High Negative Impact (60)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: N/A					
Residual impact	The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed WEF, within the BVM should be supported.				

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: The establishment of a number of renewable energy facilities and associated projects, such as the proposed WEF, in the BVM and LM has the potential to place pressure on local services, specifically medical, education and accommodation.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Local	Long term	Reversible	Low	Probable
Score	1	4	N/A	4	3
With Mitigation	Local and regional	Long term	Reversible	Low	Probable
Score	2	4	N/A	4	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Low Negative Impact (27)			Medium Negative Impact (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: The proponent should liaise with the BVM to address potential impacts on accommodation and local services.					
Residual impact	N/A				

11.13 TRAFFIC AND TRANSPORTATION

The following tables rate the impact of the increased traffic during the construction and decommissioning phases for proposed turbines.

Impact Phase: Cumulative Phase
Description of Cumulative Impact: Increased traffic on the route and access points to site - Potential to be greater than what the existing road capacity of the local road network can handle in order to operate at an acceptable level of service. This impact relates to potential disruption of traffic on local, regional and national roads. The severity of the impacts will depend on the order of the road (how many lanes, 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

Impact Phase: Cumulative Phase					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Short term	Recoverable	Probable	Probable
Score	3	2	3	3	3
With Mitigation	Local	Short term	Recoverable	Probable	Probable
Score	2	2	3	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Moderate Negative Impact (33)			Low Negative Impact (30)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: • Implementation of the Traffic Management Plan and Road Safety Measures. • Limit use of private cars. • Schedule development traffic movements to not coincide with existing peaks where possible. • Encourage use of public/staff transportation.					
Residual impact	Negative to Significant				

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: Increased traffic on the route and access points to site - Potential to be greater than what the existing road capacity of the local road network can handle in order to operate at an acceptable level of service. This impact relates to potential disruption of traffic on local, regional and national roads. The severity of the impacts will depend on the order of the road (how many lanes, 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					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Short term	Recoverable	High	Highly Probable
Score	4	2	3	4	4

Impact Phase: Cumulative Phase					
With Mitigation	Regional	Short term	Recoverable	Probable	Probable
Score	3	2	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Moderate Negative Impact (39)		Moderate Negative Impact (33)		
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: • Implementation of the Traffic Management Plan and Road Safety Measures. • Compliance to permissible heavy vehicle dimensions, permissible axle mass load on vehicles (no overloading). • Transportation scheduling to consider the time of day when the abnormal loads would be moved. • Other alternative modes of transportation (rail where feasible) should be considered.					
Residual impact	Negative to very significant				

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: Heavy vehicles are expected to cause dust along unpaved access roads to the site. This can affect the air quality and visibility for nearby residents and road users. Larger vehicles generate more dust which can limit the ability of other vehicles to overtake due to poor visibility.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Site	Immediate	Recoverable	Moderate	Probable
Score	4	2	3	4	4
With Mitigation	Site	Immediate	Recoverable	Low	Low Probability
Score	3	2	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Low Negative Impact (24)		Low Negative Impact (10)		

Impact Phase: Cumulative Phase	
Was public comment received?	No
Has public comment been included in mitigation measures?	No
Mitigation measures to enhance opportunities: • Dust control measures such as regular wet grading and wetting for dust suppression to minimize the negative impact	
Residual impact	Negligible

Impact Phase: Cumulative Phase					
Description of Cumulative Impact: Heavy vehicle traffic during construction of the development is expected to cause additional wear and tear on the surrounding road network. Gravel access roads to the sites are also expected to sustain damage during the construction phase of the project. Abnormal loads can exert more pressure on road surfaces and infrastructure, leading to increased maintenance costs and reduced road network lifespan.					
Impact Status: Negative					
	Extent	Duration	Reversibility	Magnitude	Probability
Without Mitigation	Regional	Short term	Recoverable	Moderate	Probable
Score	1	1	3	4	3
With Mitigation	Local	Short term	Recoverable	Low	Probable
Score	1	1	2	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	Low Negative Impact (27)			Low Negative Impact (21)	
Was public comment received?	No				
Has public comment been included in mitigation measures?	No				
Mitigation measures to enhance opportunities: • Limiting the number and frequency of heavy and overloaded vehicles where possible					

Impact Phase: Cumulative Phase	
• Undertaking regular maintenance, rehabilitation and upgrading substandard pavement conditions	
Residual impact	Negligible

12. SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

12.1 SOIL, LAND USE AND AGRICULTURAL POTENTIAL

The site is in an area where there is limited crop production. Cropping potential is limited by a combination of climate and soil constraints. The climate is classified as arid and therefore limiting to rain-fed cropping. The dominant soils are shallow soils on underlying weathered bedrock of the Glenrosa, Hutton, Swartland, and Mispah soil forms. There is a high proportion of rock outcrops. 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 practised.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from the footprint of a development. In the case of wind farms, the amount of land excluded from agriculture 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. Furthermore, wind farms have both positive and negative effects on the production potential of land, and it is the net sum of these positive and negative effects that determines the extent of the change in future production potential. Positive agricultural impacts identified were increased financial security for farming operations and heightened security against theft. Potential negative impacts identified in the study were the occupation of agricultural land from only a very small area. All negative potential impacts were assessed as having low significance as their impact would be very low on future agricultural production.

The allowable development limit on land of low and medium agricultural sensitivity with a land capability of < 8, as this site has been verified to be, is 2.5 ha per MW. This would allow the proposed facility of 336 MW to occupy an agricultural footprint of 336 x 2.5 = 840 hectares. The Hugo Wind Energy Facility being assessed will occupy an agricultural footprint of <108 hectares. It is therefore confirmed that the agricultural footprint of this development will be well within the allowable limit. It will in fact be approximately eight times smaller than what the development limits allow.

All the key findings substantiates that the assessment of the proposed development’s potential negative impact on the agricultural production capability is deemed acceptable for the site, and the receiving environment was verified by the specialist as having overall low to medium agricultural sensitivity. Therefore, from an agricultural point of view, **it is recommended that the development be approved.**

12.2 FRESHWATER AND WETLANDS (AQUATICS)

It was determined that the impacts upon aquatic biodiversity associated with the project are of low significance, after mitigation. The loss of irreplaceable aquatic habitat and/or important biota is highly unlikely, i.e. Very High sensitivity or No-Go areas. This also includes the spanning of a functioning drainage line, which would not be seen as problematic if suitable stormwater management and drainage from the area of the site is provided.

Most of the anticipated impacts would include disturbance during the construction phase. Changes to form and function of the site will be due to increased runoff roads or hard surfaces that would occur in the operational and maintenance (O&M) phase.

The significant impacts are associated with the access road crossings river systems. These systems are generally in a modified state and still provide some habitat and important ecological functions. Mitigation should focus on these areas and include measures to halt erosion and rehabilitate habitat in the sections affected by the construction. Without the implementation of mitigation measures, the project has potential to cause a moderate cumulative impact upon aquatic biodiversity. However, with the adoption of mitigation, the proposed project will have a low impact upon aquatic biodiversity.

The alternative substation / O&M buildings site is located within a High sensitivity area and in very close proximity to a Very High No-Go area, inclusive of the access track. Thus, it is advised that this option is not used and were therefore not assessed further.

Based on the information collected during the field investigations, ratings were verified and upheld for the riverine systems, while some of the systems were rated high (PES = B or C) as they were in a better condition. The high ecological sensitivity rating for the natural water sources was further substantiated by the fact that the affected catchments are considered Critical Biodiversity Areas, Ecological Support Areas, wetlands and rivers. Further, the sites are shown as National Freshwater Ecosystem Priority Area (NFEPA) and Mountain Catchment Areas (Matroosberg).

Mitigation should focus on these areas and include measures to halt erosion and rehabilitate habitat in the sections affected by the construction. Without the implementation of mitigation measures, the project has potential to cause a Moderate cumulative impact upon aquatic biodiversity. However, with the adoption of mitigation, the proposed project will have a Low impact upon aquatic biodiversity. This is inclusive of the potential impacts on the Matroosberg Mountain Catchment, which is protected due to its contribution to the water resources linked to this catchment. However, as the number of turbines and resultant footprint in relation to the catchment, coupled to proper stormwater management, it is anticipated that no alteration / diversion of any hydrological regimes at a catchment scale will occur. This is substantiated by the fact, that specialist, whom has also assisted with restoration / rehabilitation efforts on 19 Wind farms during and after construction, has not observed any hydrological regime changes, with only minor impacts occurring on a site scale within a small number of crossings. Thus any of the proposed mitigations for this and other projects has been sufficient to protect local surface water resources.

Considering the impacts that were assessed, **there is no objection to the authorisation of this project**, assuming all mitigations and buffer zones are implemented.

12.3 TERRESTRIAL BIODIVERSITY

The sensitivities presented in this assessment have been refined following the prescribed detailed site survey. The Sensitivities provided by the DFFE Online ST are a useful guideline, and the site’s sensitivity has been verified against the EIA layout. The data collected to date suggests that the negative impacts to terrestrial biodiversity posed by the proposed development range from Moderate to Low with adherence to the recommended mitigation measures. Some mitigation measures involve avoiding highly sensitive areas, implementing ongoing biodiversity monitoring plans for various specialisms and to continuously adapt the EMPr throughout the development's operational lifecycle.

Mitigation recommendations are standard for wind energy developments, and provided these and considerations presented in the Terrestrial Biodiversity Specialist Assessment are met, the development of the Hugo WEF will be compatible with conservation efforts in the area. For spatial planning purposes it is recommended that wind turbines be preferentially placed within modified and / or disturbed areas of cultivated lands.

It is the Specialist's opinion that the **proposed Hugo WEF be considered for environmental authorization, provided all mitigation measures are adhered to.**

12.4 FAUNAL

Two non-avian Species of Conservation Concern (SCCs) were identified as relevant sensitivity features in the animal species theme output of the Screening Tool, namely the Least Concern Caledon Copper (Aloeideas caledoni, a butterfly) and Critically Endangered Riverine Rabbit (Bunolagus monticularis), both listed as 'medium' sensitivity indicating the potential to occur on the study sit.

Two additional non-avian animal SCCs were determined relevant to the proposed development, namely the Vulnerable Leopard (Panthera pardus) and Near Threatened Grey Rhebok (Pelea capreolus).

A camera trap survey was conducted at 11 sampling locations in and around the proposed development area between 17 February 2022 and 23 December 2022, resulting in 1,832 camera trap days. A total of 2,778 independent records of 3,269 animals representing 66 species were recorded across the study area, including 63 records of Riverine Rabbit and 46 records of Grey Rhebok confirmed on site, while Caledon Copper and Leopard were not confirmed on site, both were assumed to be present for the purposes of the assessment. Riverine Rabbit was regularly recorded at three sampling locations placed in natural/near-natural vegetation and recovered vegetation on previously modified land.

The animal sensitivity of the site was mapped through consideration of existing impacts, potential impacts of the proposed development and important ecological processes that should be acting across the site and broader area. Conservation objectives for all animal SCCs relevant to the project highlight the importance of dispersal corridors across the landscape to maintain genetic diversity and long-term studies on population dynamics.

Impacts can be minimized through in-situ biodiversity rehabilitation, specifically through the restoration of strategic, currently modified areas to improve habitat connectivity for animal SCCs relative to the present condition.

Valuable research on animal SCCs can be achieved simultaneously with improvements to ecological connectivity through the establishment of long-term monitoring programmes in the study area.

The proposed development is acceptable from an animal perspective on condition that strategic areas of existing agricultural land be appropriately rehabilitated.

12.4.1 RIVERINE RABBIT

The riverine rabbit remains critically endangered, but it has become increasingly evident that these estimates are misleading. Camera trap surveys have revealed records outside the supposed range, with a higher frequency than would be expected from such a small population size. Indeed, the latest genetic evidence indicates a high degree of mitochondrial DNA (mtDNA) diversity, suggesting an effective population size closer to 5,000 individuals.

Riverine Rabbit occurrence was not correlated with distance from road, but records were absent from modified agricultural land and from sampling locations with a high number of sheep records. Notably, however, Riverine Rabbit occurrence coincided with natural, or near-natural and recovered land types.

Habitat destruction, direct and indirect mortality and disturbance impacts are potential impacts associated with the proposed development that require mitigation. The considered placement of temporary and associated infrastructure will reduce the potential impacts. In-situ biodiversity offsets through the restoration and rehabilitation of existing agricultural fields are recommended as likely to improve habitat availability and ecological connectivity relative to the status-quo. The overall size of the development footprint is small in comparison to the project boundary and total area that can be enhanced for the conservation of Riverine Rabbit.

It is the specialist’s considered opinion, based on the above assessment, that the sum of the potential benefits outweigh the drawbacks, with the equation balance supporting the approval of the proposed development from an animal perspective.

12.5 FLORA

The sensitivities presented in this assessment have been refined following the prescribed detailed site survey. The Sensitivities provided by the DFFE Online ST are a useful guideline, and the site’s sensitivity has been verified against the EIA layout. The data collected to date suggests that the negative impacts to flora communities posed by the proposed development range from Moderate to Low with adherence to the recommended mitigation measures. Some mitigation measures involve avoiding highly sensitive areas, implementing ongoing monitoring plans for and to continuously adapt the EMPr throughout the development’s operational lifecycle.

SCC are likely present on site, although none have been confirmed or sighted during the prescribed site survey. Mitigation recommendations are standard for wind energy developments, and provided these and subsequent considerations presented in this Botanical Specialist Impact Assessment are met, the development of the Hugo WEF will be compatible with conservation efforts in the area.

It is the Specialist’s opinion that the proposed Hugo WEF be considered for environmental authorization, provided all mitigation measures are adhered to.

12.6 AVIFAUNA

The Collision Risk Modelling allowed a fine-tuned assessment of not only the Passage Rates, but flight heights, the placement of turbines, and a more precise spatially explicit assessment of risk to six Priority species for which there were sufficient data. It gave eight levels of risk (from 1, the lowest, to 7.5, the highest) and the data was examined (lumped together, and for individual species) to determine where the number of risky-flight minutes could be minimised in relation to areas.

The resulting identification of risk across spatially explicit areas indicated the south-western and central areas were high risk for Red Data species and the central areas were high risk for Least Concern species. The presence of an inactive Martial Eagle nest just outside the north-east boundary was given a 3 km precautionary buffer. This, and the CRM combined, resulted in 43% of the area designated for Hugo Wind Energy Facility as No-Go for turbines.

Birds & Bats Unlimited concur with the DFFE Screening Tool Assessment that classified the Hugo area as of High Sensitivity.

According to available information collected during this study and based on the CRM-optimised layout for each of the 42 turbines proposed for the Hugo WEF, all high-risk areas for birds have been avoided.

According to available information consulted during this study to date**, there are no fatal flaws (assuming all mitigation measures will be implemented) from an avifaunal sensitivity perspective which should prevent the wind farm from proceeding.**

12.7 BATS

Passive monitoring was undertaken between 30 December 2022 and 7 March 2024. *Tadarida aegyptiaca* was the most abundant species recorded (53%), while 38% of the calls were related to *Laephotis capensis*. 4% of the overall activity recorded was similar to *Miniopterus natalensis*, 4% was *Sauromys petrophilus*, and 1% of the Long-tailed house bat. Apart from *Eptesicus hottentotus*, with a medium risk of fatality, all these species are bats that tend to fly at high altitudes resulting in a high risk of collision or barotrauma from the wind turbines.

The average monthly activity shows that bats are generally most active during the summer months, followed by autumn and spring, with reduced activity during the winter months. Peak activity was recorded in March, April and October 2023, with general high activity from February 2023 to May 2023, and again from October 2023 to March 2024.

Due to the general high bat activity on site, the development areas were classified as medium sensitive. It will therefore be necessary to mitigate turbines early in the operational phase. No turbine components are allowed in high-sensitivity zones. At present no turbines are positioned in medium-high sensitivity zones either, but if turbines are placed in medium-high sensitivity zones, curtailment will have to be applied after the testing of those turbines, when they start to turn. At present no specific turbines are recommended for curtailment. Carcass searches will determine which turbines portray the highest mortality, and mitigation measures will then be applied, starting at those turbines. Close observation by the bat specialist during the operational phase must be conducted and the below curtailment schedule should inform the discussions about curtailment.

Due to the higher bat activity and species diversity up to approximately 30 m to 40 m, it is recommended that the lowest sweep of the turbine blade is not lower than 30 m, preferably higher, if possible.

The overall potential negative impact of the proposed Hugo WEF on bats, combined for all the development phases, is predicted to be Moderate negative without mitigation, while Low negative with mitigation.

Based on the findings of the 14 months of pre-construction bat monitoring undertaken at the proposed Hugo WEF project site, the bat specialist is of the opinion that no fatal flaws exist which would prevent the construction and operation of this wind farm, but bat activity is high for the monitoring period and mitigation measures should be adhered to. **The EA may be granted, subject to the implementation of the recommended mitigation measures.**

12.8 HERITAGE AND ARCHAEOLOGY

This assessment has found that the area identified for the proposed Hugo WEF is a heritage environment of variable sensitivity but that significant impacts on palaeontological and archaeological resources arising from the project are unlikely and no fatal flaws have been identified. Impacts to the cultural landscape are expected to be significant, but these can be reduced through the implementation of suitable mitigatory measures. If the project were not implemented, the site would stay as it currently is with a neutral impact significance.

Despite the impacts to the cultural landscape, it is expected that mitigation measures will allow impacts to be managed.

It is our considered opinion, therefore, that the proposed Hugo WEF may be authorised, but subject to the recommendations contained within this report.

12.9 PALEONTOLOGY

The paleontological assessment indicates that the proposed Hugo WEF is underlain by several coastal to shallow marine formations of the Table Mountain and Bokkeveld Groups of the Cape Supergroup, of Early to Middle Devonian age (*c*. 410 – 390 Ma), some of which have fossils preserved within them.

According to SAHRA's palaeo-sensitivity map, the Hugo WEF footprint is in an area of generally very high or high paleontological sensitivity. However, a paleontological assessment for the adjacent proposed 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 palaeontological sensitivity of that project area is much lower than indicated on the SAHRA map.

It is that it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary and there is a moderate to small chance that fossils may occur in the mudstones of the Ceres Subgroup or in the Table Mountain and Bokkeveld Groups bedrock. This potential is very variable and is negatively affected by the folding and tectonic deformation of these formations within the Cape Fold Belt mountains.

The paleontological impact assessment makes the following recommendation:

- A Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the Environmental Control Officer (ECO) or other responsible person once excavations have commenced, they should be rescued and a palaeontologist called to assess and collect a representative sample, unless HWC recommends and alternative approach.

Considering the impacts that were assessed, there is no objection to the authorisation of this project, assuming all mitigations/recommendations and buffer zones are implemented.

12.10 SOCIO-ECONOMIC

The findings of the SIA indicate that the proposed Hugo WEF project will create a number of 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.

However, the Hugo WEF will have a negative visual impact on the areas sense of place. Based on the findings of the VIA (MetroGIS) the impact on sense of place is rated as High Negative. Effective mitigation is not possible. Concerns relating the potential visual impact of the proposed Hugo WEF on the areas sense of place and tourist related activities were raised by several landowners. The impact of the Hugo WEF on tourism activities was rated as Medium Negative with and without mitigation. This implies that effective mitigation will not be possible. This represents a negative externality for which the affected owners may potentially suffer a financial loss. While this loss may be offset by some form of compensation, given the areas visual sensitivity and number of established nature reserves and associated eco-tourism facilities the overall suitability of the area for the development of large-scale wind energy facilities, such as the proposed Hugo WEF, is a concern. The cumulative impacts are rated as Very High Negative which heightens the concern.

Based on the findings of the SIA the suitability of establishing large WEFs, including the proposed Hugo WEF, in the area to the south of the N1 is questioned. The development of renewable energy facilities in the area to the south of the N1 represents a spillover from the Komsberg REDZ located to the north of the N1. From a long-term planning perspective this may not be ideal, specifically given the environmental and scenic qualities of the area. In this regard the Western Cape Provincial Spatial Development Framework highlights the importance to the Province’s landscape and scenic assets and threat posed by large scale infrastructural developments such as wind farms.

It is also important to note that the benefits associated with the Hugo WEF are not site dependent and would also be associated with an alternative site. This point is relevant given the environmental and social sensitivity of the study area.

<u>EAP Motivation</u>

According to the visual assessment, landowners/receptors and travelers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective.

As mentioned above, the Western Cape Provincial Development Framework Western Cape’s cultural and scenic landscapes are significant assets that underpin the tourism economy, however according to the key Provincial climate change challenge, the plan is to devise and introduce effective adaptation and mitigation responses, especially for vulnerable municipalities. One of the focus areas for mitigation is renewable energy, which is directly applicable to this Project application. Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations.

Furthermore, with load shedding costing South Africa's economy R500 million per stage, per day and the Western Cape's economy R75 million per stage (according to BusinessTech 2021), the country's energy crisis, needs large-scale private sector participation, in partnership with government. This will be key in addressing the current shortfall in the Western Cape.

To accelerate the decarbonisation of South Africa's economy and support economic growth, government from South Africa, France, Germany, the United Kingdom and the United States, along with the European Union announced a long-term Just Energy Transition Partnership in November 2022.

The Western Cape Climate Change Response Strategy (WCCCRS) was adopted in February 2014. The strategy is an update of the 2008 Western Cape Climate Change Response Strategy and Action Plan. The key difference with the 2008 Strategy is a greater emphasis on mitigation, including strategically suitable renewable energy development. The development of the WEF will contribute to national and global efforts to significantly reduce Green House Gas (GHG) emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions.

Given the aforementioned framework and the Western Cape Green Economy Strategy, the establishment of this Wind Energy Facility will contribute to South Africa's decarbonization efforts while simultaneously stimulating development and generating employment opportunities, leading to improved economic growth.

The developer has taken into account the visual impact findings and has revised the layout multiple times to minimize visual impacts. However, the specific turbines which are located in high sensitivity areas are positioned there to take advantage of the optimal wind potential. Relocating or removing these turbines would render the project unfeasible and undermine its support for the green economy strategy and the just energy transition, bearing in mind that this transition is important to the country and to the future growth of the renewables sector.

12.11 VISUAL/LANDSCAPE

Overall, the significance of the visual impacts associated with the proposed Hugo Wind Energy Facility is expected to be very high to high as a result of the generally undeveloped character of the landscape and its inability to absorb changes of this magnitude. Additionally, the facility would be visible within an area that contains certain sensitive visual receptors who already consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along the national, arterial and secondary roads, as well as, residents of rural homesteads and tourists passing through or holidaying in the region.

Night time impacts have also been assessed whereby it was determined that the significance of lighting (particularly aircraft warning lighting mounted on the turbines) on the nightscape would be high post mitigation. As discussed, the greater environment is largely natural in character with limited built infrastructure. Unblemished night skies are a key attribute to the study areas sense of place and night time visual character. Light sources in the area are limited to isolated farm and homesteads and fleeting light from passing cars travelling along the R318 and other secondary roads. Therefore, the introduction of new light sources into a relatively dark night sky, will have an impact on the visual quality of the study area at night.

According to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

1. Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of the stakeholders and decision-makers to be unacceptable.

In terms of the above and to the knowledge of the author the proposed development is compliant with all Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites, as well as, conditions of existing Records of Decisions. However, it must be noted that as per the *Guideline for the Management of Development on Mountains, Hills and Ridges of the Western Cape (April 2002),* development on the crest of a mountain, hill or ridge will be strongly discouraged.

Furthermore, with regards to point 3 above, it has been established through the course of this assessment that many objections to the proposed Hugo WEF have been received by stakeholders within the region, as communicated by the EAP and social impact specialist. It should be noted that certain stakeholders also indicated that they ok with the WEF in principle (personal communication with the social specialist). Therefore, with the information available to the specialist at the time of writing this report, it cannot be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, the specialist reserves the right to revise the statement below.

In spite of the predominantly very high to high residual ratings and the likelihood that the proposed development will be met with concern and objections from some of the affected sensitive receptors and landowners in the region, this report cannot categorically state that any of the above conditions were transgressed. As such these visual impacts are not considered to be fatal flaws for a development of this nature.

The proposed Hugo Wind Energy Facility will only be supported from a visual perspective if the mitigation measures are implemented, the layout adjusted accordingly and all best practice mitigation measures, as provided in this report are implemented and adhered to:

- Turbines labelled WTG 18, 19, 21, 23, 27 and 28 in the east be relocated outside of areas marked as mountains and tall hills (high sensitivity)
- Turbines labelled WTG 1, 2, 3, 9, 10, 11 and 12 in the west be reconsidered and located outside of areas marked as mountains and tall hills (high sensitivity)
- While no turbines are located within the stipulated 500 m buffer from the R318, it should be noted that the Breede Valley local municipality and the Langeberg spatial development framework considers the R318 to be a scenic route. Therefore, the implementation of a 1 km buffer along this route is considered to be preferrable by the visual specialist

EAP Motivation

According to the visual assessment, landowners/receptors and travelers may view the turbines in a negative light, for others, wind turbines are not regarded as visually intrusive. The perception of what constitutes a negative visual impact is therefore personal and subjective. We have considered the responses from all Interested and Affected Parties (I&APs). In response, detailed simulations and visualisations were undertaken from various guesthouses to understand and address potential visual impacts. Adjustments to turbine placement was made based on the outcome of the visual impact assessment. Despite these efforts, some opposition persists.

The turbines located in high sensitivity areas (WTG 1, 2, 3, 9, 10, 11, 12, 18, 19, 21, 23, 27 and 28) are positioned there to take advantage of the optimal wind resource. Relocating or removing these turbines would render the project unfeasible and undermine its support for the green economy strategy and the just energy transition. Furthermore, turbines can be made less visible through surrounding vegetation and the layout of terrain.

I would also like to highlight the proposed Exemia game reserve (where the objections persist). Currently, the proposed campsite area remains undeveloped, and no concrete plans have been provided, so it is considered a future intent project.

The turbines located in the Matroosberg Mountain Catchment Area (WTG 1, 2, 9, 10, 11 and 12) will have a low impact on the Matroosberg Mountain Catchment if all mitigation measures are implemented. This Catchment Area is protected due to its contribution to the water resources linked to this catchment. However, as the number of turbines and resultant footprint in relation to the catchment, coupled to proper stormwater management, it is anticipated that no alteration / diversion of any hydrological regimes at a catchment scale will occur. This is substantiated by the fact, that the aquatic specialist, who has assisted with restoration / rehabilitation efforts on 19 Wind farms during and after construction, has not observed any hydrological regime changes, with only minor impacts occurring on a site scale within a small number of crossings. Thus, any of the proposed mitigations for this and other projects has been sufficient to protect local surface water resources.

Although the wind farm's visual impact on residents and tourism is high, the decision to proceed with its development is motivated by its considerable environmental and economic benefits. The project will contribute to the aforementioned frameworks, Western Cape Green Economy Strategy and Just Energy Transition and this transition is important to the country and to the future growth and sustainability as an organisation.

The establishment of the Wind Energy Facility will contribute to South Africa's decarbonization efforts while simultaneously generating employment opportunities, leading to improved economic growth. The nearest rural community is approximately 7.5 km from the proposed wind farm site. The development of the wind farm is expected to boost the local economy by creating job opportunities and supporting local businesses.

Additionally, traffic mitigation measures will be enforced to minimize disruptions for local residents and tourism activities, ensuring that the overall benefits of the wind farm outweigh the challenges.

12.12 NOISE

This study considers the potential noise impact on the surrounding environment due to the construction, operational and future decommissioning activities associated with the Hugo WEF project. It was determined that the potential noise impacts, without mitigation, would be:

- Of a medium significance for the daytime construction of the access roads (access roads are far from verified NSR); Mitigation measures are available and were included in this assessment that would reduce the potential significance of the noise impact to low;
- Of a low significance for the daytime construction traffic passing NSR (access roads are far from verified NSR);
- Of a low significance for the daytime construction activities (hard standing areas, excavation and concreting of foundations and the erecting of the WTG and other infrastructure) at the Hugo WEF;
- Of a medium significance for the night-time construction activities (such as the pouring of concrete, erecting the WTG) at the Hugo WEF. Mitigation is available to reduce the significance of the noise impact to low;
- Of a low significance for the daytime operational activities at the Hugo WEF; and
- Of a low significance for operational activities (noises from wind turbines) at the Hugo WEF when considering the worst-case PWL.

There is no potential for a cumulative noise impact.

Community involvement needs to continue throughout the project. Annoyance is a complicated psychological phenomenon, as with many industrial operations, expressed annoyance with sound can reflect an overall annoyance with the project, rather than a rational reaction to the sound itself. At all stages, surrounding receptors should be informed about the project, providing them with relevant information. The magnitude of the sound levels will depend on a multitude of variables and will vary from day to day and from place to place with environmental and operational conditions. Audibility is distinct from the sound level because it depends on the relationship between the sound level from the activities, the spectral character and that of the surrounding soundscape (both level and spectral character).

The developer must implement a community grievance mechanism. All potential sensitive receptors should be made aware of these contact numbers. The proposed WEFs should maintain a commitment to the local community (people staying within 2,000 m from construction or operational activities) and respond to noise concerns in an expedient fashion.

From an acoustic perspective the turbine layout is considered acceptable should the applicant select to use a turbine model with a SPL less than 109.2 dBA (re 1 pico Watt (pW)) and it is recommended that the Hugo WEF be authorised.

It should be noted that this is subject to the condition that the applicant select appropriate measures to ensure that the potential high significance noise impact associated with night-time construction activities be eliminated.

It should be noted that the applicant should re-evaluate the noise impact should:

- the layout be revised (as part of amendment process post EA) where any WTG, located within 2,500 m from a confirmed NSR, are moved closer to the NSR;

- the layout be revised (as part of amendment process post EA) where any new WTG are introduced within 2,500m from an NSR;
- the layout be revised (as part of amendment process post EA) where the number of WTG within 2,500m from an NSR are increased; and
- the applicant selects to use a WTG with a SPL higher than 109.0 dBA (re 1 pW).

The applicant should also develop and implement an environmental noise monitoring programme at selected NSR living within the 42 dBA noise contour.

It is proposed that the applicant recommend to landowners that:

- no new residential dwellings be developed within areas enveloped by the 42 dBA noise level contour, and
- structures located within the 45 dBA noise level contour should not be used for permanent residential purposed.

12.13 TRAFFIC AND TRANSPORTATION

The proposed development and final layout can be supported from a traffic engineering point of view. The base year and forecast year road capacity has indicated that the proposed development will have little to no significant impact on the existing road network capacity and intersection operational performance. Given the findings of this report, it is recommended that the proposed development be considered favourably from a traffic engineering point of view as the intended construction will have no significant negative impact on the surrounding road network. **The project can be considered for environmental authorisation.**

The following recommendations are made:

- A comprehensive route assessment of the entire transportation route to verify clearance, load bearing and sweeping radius distances is recommended.
- The substation access is recommended as the access position, based on safety considerations and mitigation measures outlined in the report. This is essentially a proposal to relocate the existing access in order to meet the required sight distance requirements for the class of vehicle that will be using the access.
- It is recommended that the access points be priority controlled and widened to allow for acceleration lane and dedicated right turn lane off the main road, which will incorporate the turning characteristics of the expected abnormal vehicles.
- Clearance permits will be required for the transport of the WT components.
- It is recommended that applications for Abnormal Permits be lodged to the Department of Transport and Public Works, Eskom and Telkom (where affected) at the time of construction.

13. IMPACT STATEMENT

13.1 CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORIZATION

13.1.1 FRESHWATER AND WETLANDS (AQUATICS)

- Any of the activities, should also be monitored by the appointed EO/ECO on a daily basis, especially during periods of river flow during construction.
- Any points of erosion should be stabilised immediately (sandbags in the short term) using gabions and reno mattress as required. No activities should take place outside of the demarcated servitude, to prevent additional cumulative impacts on these systems.
- Prior to construction, the EMPr, must include a Construction Specific Monitoring and Rehabilitation Plan related to the water course and wetland crossings, and specifically to the prevention of erosion and sedimentation as these systems are prone to scour, with rehabilitation options being limited due to the sparse nature of the vegetation. This will need to be undertaken by a registered specialist.
- Monitoring should occur on a monthly basis for 6 months post construction and where any unstable soils occur, these must be protected with temporary stabilisation dependent on the scale of the impact i.e. sandbags - hay bales) until areas become revegetated. If any areas require permanent erosion protection (e.g. gabions or stone pitching) then the WULA/GA must be amended to include these areas.

13.1.2 FAUNA

- Implement all recommended mitigation measures, and agreements in place with the developer and landowners.

13.1.3 AVIFAUNA

- Turbines falling in the risk Class 5.0 and above should be moved into lower risk classes.
- Turbines falling into Class 4.5 must be mitigated with patterned/striped-blades or SDOD.
- Turbines in Class 4 and below do not require mitigation unless the following occurs:
    - Should any turbines kill one Critically Endangered/Endangered Red Data species per year they must be (retro) fitted with some form of mitigation (striped blade, or SDOD, or hourly/daily/seasonal curtailment) to reduce fatalities to negligible level. This mitigation is recommended because it is essential that an immediate response is forthcoming. This covers, in particular, Black Harrier, a species for which population viability modelling indicates that we cannot afford to lose even one more adult bird (Cervantes et al. 2022).
    - For other Red Data species (Vulnerable and Near Threatened) and other collision-prone species a specific response and bird fatality threshold must be discussed and implemented within 30 days by an avifauna specialist appropriate to the rarity (and population viability) of the species involved.
    - Ideally this should be a separate and adaptive management plan for the site prior to construction. This policy could be included as an annexure to the operational EMP for the WEF. Most importantly, this plan should identify the number of bird fatalities of

Priority species which will trigger a management response, the appropriate response, and timelines for such responses. Fatalities of Priority bird species are usually rare events (but with very high consequences) so such fatalities should be responded to timeously and as they occur. It is, therefore, important to have a threshold policy in place to proactively assist adaptive management.

  - Given the extensive modelling of risk by the CRM, based on a data set collected in a high species-richness and abundance year, resulting in the re-location of all turbines outside the high-risk areas by the client, the likelihood that fatalities will occur is low, and these additional mitigations are unlikely to be required.

13.1.4 BATS

- The final layout must be informed by the sensitivity map provided in Volume II – Bat Specialist Report, Section 6. 10.
- A bat specialist must be appointed before the commercial operation date. Mitigation measures, as per Section 7 of Volume II, must form part of the operational EMPr, and be applied as directed.
- Turbines must be feathered below cut-in speed, and although they need not be at a complete standstill, there should be minimum movement so that bats are not at risk when turbines are not generating power.
- All newly built structures that have bat conducive features must be rehabilitated to discourage bat presence: Roofs of new buildings must be sealed and any open quarries and borrow pits created during construction must be rehabilitated.
- No roll-up garage doors should be installed at the new buildings.
- A minimum of two year's operational bat monitoring must be conducted after the commencement of operations at the proposed Hugo WEF, as per the guidance of the latest operational SABAA guidelines. Due to the high bat activity and future installation of mitigation measures, it might be necessary to conduct operational monitoring beyond the minimum of two years.

13.1.5 HERITAGE AND ARCHAEOLOGY

- A pre-construction archaeological walkdown survey of the final WEF layout must be conducted by a suitably qualified archaeologist.
- In the event of archaeological resources being encountered during the course of development, work in the immediate area must be halted and the find reported to the ECO. The ECO must inform HWC so that mitigatory action can be determined and be implemented if necessary. The find may require inspection or collection/excavation by an archaeologist. Such heritage is the property of the state.
- Should human remains be encountered, activities work in the vicinity of the find must cease, the remains must be left in situ but made secure and HWC must be notified immediately so that mitigatory action can be determined and be implemented.
- The screening of infrastructure area(s) from the R318.
- Keeping the construction and decommissioning duration as short as possible and as much of the activity as possible out of the public view.
- Ensuring that night-time light pollution is minimized.

- Keeping construction and maintenance-related activities in designated and approved areas.

13.1.6 PALAEONTOLOGY

- A Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the ECO or other responsible person once excavations have commenced, they should be rescued and a palaeontologist called to assess and collect a representative sample, unless HWC recommends and alternative approach.

13.1.7 SOCIO-ECONOMIC

- The recommendations of the VIA should be implemented, including the relocation of identified wind turbines and installation of radar activated civil aviation lights.

13.1.8 NOISE

It should be noted that the applicant should re-evaluate the noise impact should:

- The layout be revised (as part of amendment process post EA) where any WTG, located within 2,500m from a confirmed NSR, are moved closer to the NSR;
- The layout be revised (as part of amendment process post EA) where any new WTG are introduced within 2,500m from an NSR;
- The layout be revised (as part of amendment process post EA) where the number of WTG within 2,500m from an NSR are increased; and
- The applicant selects to use a WTG with a SPL higher than 109.0 dBA (re 1 pW).

The applicant should also develop and implement an environmental noise monitoring programme at selected NSR living within the 42 dBA noise contour.

13.1.9 TRAFFIC AND TRANSPORTATION

- A comprehensive route assessment of the entire transportation route to verify clearance, load bearing and sweeping radius distances is recommended.
- The substation access is recommended as the access position, based on safety considerations and mitigation measures outlined in the report. This is essentially a proposal to relocate the proposed existing access in order to meet the required sight distance requirements for the class of vehicle that will be using the access.
- It is recommended that the access points be priority controlled and widened to allow for acceleration lane and dedicated right turn lane off the main road, which will incorporate the turning characteristics of the expected abnormal vehicles.
- Clearance permits will be required for the transport of the WT components.
- It is recommended that applications for Abnormal Permits be lodged to the Department of Transport and Public Works, Eskom, and Telkom (where affected) at the time of construction.

13.1.10 VISUAL/LANDSCAPE

- Turbines labelled WTG 18, 19, 21, 23, 27 and 28 in the east be relocated outside of areas marked as mountains and tall hills (high sensitivity);
- Turbines labelled WTG 1, 2, 3, 9, 10, 11 and 12 in the west be reconsidered and located outside of areas marked as mountains and tall hills (high sensitivity); and

- While no turbines are located within the stipulated 500 m buffer from the R318, it should be noted that the Breede Valley local municipality and the Langeberg spatial development framework considers the R318 to be a scenic route. Therefore, the implementation of a 1 km buffer along this route is considered to be preferrable by the visual specialist.

Please refer to the EAP motivation, justifying why turbines are located in these high sensitive areas.

14. CONCLUSION

Based on the finding of the specialist studies, the information contained in this environmental impact assessment report and the evolution of the site development plan, it is the opinion of the EAP that the proposed development can be authorised, provided the above listed mitigation measures, as well as those contained in the Final EMPr, are adhered to by the applicant.

ERM

APPENDIX A EAP DECLARATION OF INDEPENDENCE AND CV

ERM

APPENDIX B ENVIRONMENTAL MANAGEMENT PROGRAMMES

ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina
Australia
Belgium
Brazil
Canada
China
Colombia
France
Germany
Ghana
Guyana
Hong Kong
India
Indonesia
Ireland
Italy
Japan
Kazakhstan
Kenya
Malaysia
Mexico
Mozambique
The Netherlands
New Zealand
Peru
Poland
Portugal
Puerto Rico
Romania
Senegal
Singapore
South Africa
South Korea
Spain
Switzerland
Taiwan
Tanzania
Thailand
UAE
UK
US
Vietnam

ERM's [Office name]
1st Floor
Great Westerford
240 Main Road, Rondebosch
7700, Cape Town, South Africa

Tel: +27 21 681 5400
Fax: +27 21 686 0736
www.erm.com

Back cover

Update the ERM address details for your current location.

Delete this box when not required.