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VOLUME I:
BASIC ASSESSMENT REPORT

For

THE PROPOSED ELECTRICAL GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE FOR THE HIGHLANDS SOUTH WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

14/12/16/3/3/1/1959

On behalf of

HIGHLANDS SOUTH WIND ENERGY FACILITY (RF) (PTY) LTD

JANUARY 2019

BASIC ASSESSMENT REPORT FOR THE PROPOSED ELECTRICAL GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE FOR THE HIGHLANDS SOUTH WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

On behalf of

Highlands South Wind Energy Facility (RF) (PTY) Ltd

January 2019

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PROJECT DETAILS

DEA Reference Number:	14/12/16/3/3/1/1959
Arcus Reference No:	2780 South Grid
Title:	Basic Assessment Report for the Proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, Eastern Cape Province
EAPs:	Ashlin Bodasing, Anja Albertyn and Ryan David-Andersen - Arcus Consultancy Services South Africa (Pty) Ltd
Project Team:	Andrew Pearson - Arcus Consultancy Services South Africa (Pty) Ltd Jonathan Aronson - Arcus Consultancy Services South Africa (Pty) Ltd Michael Reid – Arcus Consultancy Services Ltd Simon Todd – 3 Foxes Consulting Dr Brian Colloty / Patsy Scherman – Scherman Colloty and Associates Bernard Oberholzer Landscape Architect in association with Quinton Lawson Architect Jayson Orton and Dr John Almond – Asha Consulting Tony Barbour – Tony Barbour Environmental Consulting and Research Stephen Fautley - Techso
Project Applicant:	Highlands South Wind Energy Facility (RF) (Pty) Ltd
Report Status:	Final Basic Assessment Report

Changes made from Draft to Final BA Report	**Section**
Date changed to January 2019	Volume I: Section 1 to 20
Typographical and formatting corrections	Volume I: Section 1 to 20
Added Table C: Geographic coordinates of linear activities to be authorised	Volume I: Page iii
The wording in Table NEMA listed activities was changed from 'may' to 'will' where applicable	Volume I: Section 2: Table 2.1 Volume I: Appendix B: EMPr: Table 3.2
Table 2.2: Legislative Requirements for Scope of Assessment and Content of Basic Assessment Reports has been updated as follows: *where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;* — ~~n/a~~ Commencement of construction will occur within 10 years of authorisation and conclude within 5 years of commencement. Post-construction monitoring requirements will be finalised within this period.	Volume I: Section 2: Table 2.2
Section 4: Public Participation was updated to reflect process completed to date and summary of issues raised	Volume I: Section 4
The word 'should' has been changed to 'must' in the EMPr where applicable.	Volume I: Appendix B: EMPr
Added Figure 3 Environmental Sensitivity to the EMPr	Volume I: Appendix B: EMPr:

	Figure 3
An Avifauna Monitoring and Management Plan was collated from mitigation measures already listed in the avifaunal impact assessment and added to the EMPr	Volume I: Appendix B: EMPr, Section 19
The word draft was removed throughout the document where applicable.	Volume I: Appendix B: EMPr
Typographical and grammatical errors were corrected and minor clarifications were made throughout the document.	Volume I: Appendix B: EMPr
Turbine numbers were added to Figure 8, Soil Impact Assessment	Volume II: Soil impact Assessment
Turbine numbers were added to Figure 10, Avifaunal Sensitivity	Volume II: Avifauna Impact Assessment
Turbine numbers were added to Map 7 Highlands Visual Sensitivity	Volume II: Visual Impact Assessment
Table 19 Cumulative impacts was added to better demonstrate that the result of the cumulative assessment was reached using the assessment methodology.	Volume II: Visual impact Assessment Section 13
Added "The VIA addresses the preferred alternative for the three proposed wind farms. The preferred alternative is the result of numerous iterations taking into account engineering as well as the constraints identified by the various specialist studies, and therefore a number of alternatives have been tested and refined as part of the process." to clarify the assessment of alternatives conducted.	Volume II: Visual impact Assessment Section 13 Visual Assessment of Alternatives
Wording was changed to clarify that Hacking method was used for the intensity determination in the impact tables (categories low, medium and high only). "Based on the potential visual impacts outlined in Section 11 above it is expected that the intensity of the impacts would be **medium for the operational** phases of the proposed wind farms, and **medium for the operational phases** of the powerline and related infrastructure.	Volume II: Visual impact Assessment Section 12 Visual Impact Assessment proposed Wind Farms
Wording was changed to clarify significance rating versus visual intensity rating: "The potential visual impact significance of the proposed Highlands wind farms during construction would be **Moderate significance**. The North wind farms visual impact could be of **Moderate significance** during the operation phase, but being in close proximity to the R63 Route and *Bruintjieshoogte* Pass and a number of farmsteads in the area it's visual intensity would be higher than the Central and South wind farms, i.e. Moderate-high **visual intensity**.	Volume II: Visual impact Assessment Section 15 Findings and Recommendations
The Comments & Responses Report was updated to present the PPP conducted to date, as well as all comments received and responses given.	Volume III: Comments & Response Report

EXECUTIVE SUMMARY

Introduction

WKN Windcurrent South Africa (Ltd) Pty (the Developer) is proposing the Highlands Wind Energy Facilities (WEFs), and associated infrastructure including grid connection infrastructure (the Proposed Development), located 20 km from the town of Somerset East in the Eastern Cape Province. The Proposed Development Site is situated within the Cookhouse Renewable Energy Development Zone (REDZ). The area of interest for development within these land parcels is approximately 9000 hectares (The Proposed Development Area). The Proposed Development aims to generate and produce electricity from renewable wind energy sources in order to supply electricity into the national grid by connecting to an existing Eskom transmission line within the Proposed Development Area.

Arcus Consultancy Services South Africa (Ltd) Pty ('Arcus') has been appointed to act as the independent environmental impact assessment practitioner (EAP) to undertake the environmental impact assessment (EIA) process for Environmental Authorisation under Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) as amended, for the Proposed Development.

For the purpose of obtaining Environmental Authorisation (EA), and bidding requirements in the Department of Energy's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), the project has been split into three phases: North, Central and South. A Special Purpose Vehicle (SPV) has been set up for each of the three phases. Each phase will consist of two applications: one for the wind energy facility and one for the respective grid connection. The proposed Development therefore consists of six components and six separate applications for EA:

- Highlands North Wind Energy Facility (RF) (PTY) Ltd:
  - The Highlands North WEF consisting of up to 17 turbines each with a generating capacity of up to 5 MW generating up to 85 MW (The Proposed Project);
  - Electrical Grid Connection and Associated Infrastructure for Highlands North WEF;
- Highlands Central Wind Energy Facility (RF) (PTY) Ltd:
  - The Highlands Central WEF: up to 14 turbines each with a generating capacity of up to 5 MW generating up to 70 MW;
  - Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
- Highlands South Wind Energy Facility (RF) (PTY) Ltd:
  - The Highlands South WEF: up to 18 turbines each with a generating capacity of up to 5 MW generating up to 90 MW;
  - **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF**.

This report pertains to the **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF**.

Should the Proposed Development be bid in the REIPPPP two submissions will potentially be made: The Highlands North WEF will be combined with the Highlands Central WEF or be bid on its own, with the Highlands Central WEF being combined with Highlands South WEF. Due to these uncertainties the specialist studies have described the baseline environment of the entire Proposed Development Site as the affected environment. The impact assessments however assess the Proposed Project individually, as well as cumulatively.

Highlands South WEF Grid Connection Site Location and Proposed Development Description

The Proposed Highlands South Grid Connection would be located approximately 17 km west of the town of Somerset East, bordering the south of the R63 route, approximately 23 km south-east of Pearston, in the Eastern Cape Province. The Proposed Development site is located in the Blue Crane Route Local Municipality (BCRLM) in the Sarah Baartman District Municipality (SBDM), previously known as the Cacadu District Municipality. The main settlements in the municipality are Somerset East, which serves as the administrative and commercial centre, Cookhouse and Pearson. The most significant roads passing through the area are the N10, R61, R63, and the R390. The administrative seat of the SBDM is currently located in the Nelson Mandela Bay Metro area, with disaster centres located throughout the district.

A Feasibility Assessment was conducted by the specialist team prior to the Basic Assessment process. The results of these preliminary assessments advised the development of the proposed project layout for assessment (embedded mitigation). This layout was improved further by the results of the detailed specialist studies conducted, resulting in the Final Mitigated Layout, as the best practicable environmental option submitted for authorisation.

Environmental Legislative Requirements

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 Environmental Affairs (DEA).

Listed Activities applicable to this proposed project are presented in the table below. All potential impacts associated with these Listed Activities are considered and assessed in this BA.

Applicable Listed Activities in terms of the NEMA

LISTING NOTICE	ACTIVITIES
LN 1 GN R327[1]	11(i); 19 and 27
LN 3 GN R324[2]	4(a)(i)(bb)(ee); 14(a)(c)(a)(i)(bb)(ff) and 23(a)(c)(a)(i)(bb)(ee).

Depending on the final design of the Highlands South WEF Grid Connection, there may be a requirement for the following additional permits/ authorisations:

- Waste Management License/s as required by the NEMA, Waste Act, 2008 (Act No. 59 of 2008);
- Mining Permits as required by the Minerals and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002)(MPRDA); and
- Water Use Licenses as required by the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

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

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

Results of Specialist Investigations

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Grid Alternative 1 and 2							
Construction and Decommissioning Phase							
Soil degradation	L	M	M	Negative	M	M	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Cumulative Phase							
Regional loss of agricultural land use	L	M	L	Negative	L	L	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Wetlands and freshwater							
Grid Alternative 1 and 2							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Impact on localized surface water quality	L	M	L	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Cumulative Phase							
Cumulative Impact	L	M	L	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Terrestrial Ecological Impacts							
Grid Alternative 1 and 2							
Construction Phase							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Faunal Impacts	L	L	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Operational Phase							
Soil Erosion	L	H	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Alien plant	L	H	M	Negative	M	H	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
invasion							
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Decommissioning Phase							
Faunal impacts	L	L	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Soil erosion	L	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Alien plant invasion	L	H	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Avifauna							
Grid Alternative 1 and 2							
Construction Phase							
Destruction of habitat	M	M	M	Negative	M	H	M
With Mitigation	*L*	*L*	*M*	*Negative*	***L***	*L*	*M*
Disturbance / Displacement	M	M	M	Negative	M	H	M
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*M*
Operational Phase							
Power line collisions	H	M	H	Negative	H	H	M
With Mitigation	*M*	*M*	*H*	*Negative*	***M***	*M*	*M*
Bird mortality from electrocution	M	M	M	Negative	M	M	H
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*H*
Disturbance / Displacement	M	M	M	Negative	M	M	M
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*M*
Decommissioning Phase							
Disturbance / Displacement	M	M	M	Negative	M	H	M
With Mitigation	*M*	*M*	*M*	*Negative*	***L***	*L*	*M*
Cumulative Phase							
Cumulative impact	H	M	H	Negative	**H**	M	M
With Mitigation	*H*	*M*	*M*	*Negative*	***M***	*L*	*M*
Bats							
Grid Alternative 1 and 2							

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Construction Phase							
Roost disturbance	L	L	L	Negative	L	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Roost destruction	L	H	L	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Habitat Modification	L	L	L	Negative	L	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Operational Phase							
Collision with transmission lines	L	M	L	Negative	L	L	M
With Mitigation	*L*	*M*	*L*	*Negative*	***VERY L***	*L*	*M*
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	L
With Mitigation	H	M	L	*Negative*	M	M	M
Heritage and Archaeology							
Grid Alternative 1 and 2							
Impacts on archaeological resources	L	H	L	Negative	L	L	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts on graves (Alternative 1)	L	H	H	Negative	M	L	H
With Mitigation (Alternative 1)	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts on graves (Alternative 2)	L	H	H	Negative	M	L	H
With Mitigation (Alternative 2)	*L*	*H*	*L*	*Negative*	***M***	*L*	*H*
Impacts to the cultural landscape	L	M	L	Negative	M	H	H
With Mitigation	*L*	*M*	*L*	*Negative*	***M***	*H*	*H*
Cumulative Phase							
Impacts on archaeological resources	L	H	L	Negative	M	M	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Impacts on graves	L	H	H	Negative	M	L	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts to the cultural landscape	M	M	M	Negative	M	H	H
With Mitigation	*M*	*M*	*M*	*Negative*	***M***	*H*	*H*
Palaeontology							
Grid Alternative 1 and 2							
Impacts to palaeontological resources	L	H	L	Negative	L	L	M
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*M*
Visual							
Grid Alternative 1 and 2							
Rural sense of place - construction	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Rural sense of place - operaion	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H
Rural sense of place - decommission	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Neutral	L	L	M
Social							
Grid Alternative 1 and 2							
Construction Phase							
Employment and business opportunities	M	L	M	Positive	M	M	H
With Mitigation	*H*	*L*	*H*	*Positive*	***M***	*H*	*H*
Presence of construction workers	M	L	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Influx of job-seekers	M	L	L	Negative	L	L	M
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*M*
Risks to livestock and farming	M	L	M	Negative	M	M	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
infrastructure							
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Risk of grass fires	M	L	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Noise, dust, waste and safety impacts	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Establishment of access roads and the construction camp	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Operational Phase							
Employment and business opportunities	M	M	L	Positive	M	M	H
With Mitigation	*M*	*M*	*M*	*Positive*	***M***	*H*	*H*
Powerline pylons on the rural landscape	L	H	M	Negative	M	H	H
With Mitigation	*L*	*H*	*M*	*Negative*	***M***	*H*	*H*
Decommissioning Phase							
Loss of jobs and associated income	M	M	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Cumulative Phase							
Visual Impact	M	M	L	Negative	L	M	M
With Mitigation	*M*	*M*	*L*	*Negative*	***L***	*M*	*M*
Employment opportunities	M	H	M	Positive	M	L	H
With Mitigation	*M*	*H*	*M*	*Positive*	***H***	*M*	*H*
Traffic							
Grid Alternative 1 and 2							
Construction Phase							
Vehicle Worker Crashes	L	L	H	Negative	M	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road degradation	L	L	H	Negative	M	M	M

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road dust	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Intersection safety	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*H*	*Negative*	***M***	*L*	*M*
Operational Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
With Mitigation	*n/a*	*n/a*	*n/a*	*Negative*	***n/a***	*n/a*	*n/a*
Decommissioning Phase							
Minor road degradation	L	L	M	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road dust	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Cumulative Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
With Mitigation	*n/a*	*n/a*	*n/a*	*Negative*	***n/a***	*n/a*	*n/a*

Summary of Findings and Conclusion

This BAR aims to capture the key issues for this proposal through a public participation process and through the findings of the specialists' studies.

The specialist reports document the assessment of environmental impacts that may occur within both the biophysical and social environments. All specialist reports are included in Volume II of this report.

All specialist studies have indicated that either of the alternatives proposed for the development grid connection from the proposed Highlands South WEF to the existing Eskom Transmission line would be acceptable from an environmental perspective.

Consideration must be given to the fact that this proposal is dependent on the approval and construction of the proposed Highlands South WEF (separate application), and should the latter not be approved, the likelihood of this proposal for the Highlands South Grid Connection being implemented is low. The reason for the separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed grid connection may become the property of Eskom, and would not be controlled by the applicant.

The area in which the site is found has been deemed a Renewable Energy Development Zone (REDZ) by the Council of Scientific Research (CSIR), earmarked through the developing Strategic Environmental Assessments (SEAs) for the Department of Environmental Affairs.

Overall, it is recommended that the Highlands South Grid Connection be supported, subject to the implementation of the recommended mitigation measures and management actions contained in all the specialist reports.

ABBREVIATIONS, ACRONYMS AND UNITS

ATNS	Air Traffic and Navigation Services SOC Limited
BA	Basic Assessment
BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
dB	Decibel
DEA	Department of Environmental Affairs (National)
DEDEA	Eastern Cape Department: Economic Development Environmental Affairs, and Tourism
DMR	Department of Mineral Resources
DoE	Department Of Energy
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EIA Assessment	Environmental Impact
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GIS Systems	Geographical Information
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt
NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NSD	Noise-sensitive Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PPA	Power Purchase Agreement
PPP	Public Participation Process
PV	Solar photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SABAAP	South African Bat Assessment Advisory Panel
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAPS	South African Police Service
SAWS	South African Weather Service
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA Assessment	Strategic Environmental
SIA	Social Impact Assessment
SPV	Special Project Vehicle
WEF	Wind Energy Facility
WHO	World Health Organisation
WTG	Wind Turbine Generator
WULA	Water Use License Application

DEPARTMENT OF ENVIRONMENTAL AFFAIRS INFORMATION REQUIREMENTS FOR WIND FARM APPLICATIONS

The Department of Environmental Affairs' requirements for information for all applications for Grid Connections is 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 A: DEA Information Requirements – Grid Connection Technical Details

Component	Description/Dimensions
Height of pylons	Maximum of 30 m high
Length of transmission line	Max 20 km depending on the substation location and OHL route selected.
Type of poles used	Both monopoles and lattice structures are being considered at this point.
Area occupied by pylon servitude	Width of servitude = 31 m. Maximum total area occupied 62.0 ha
Transmission capacity	Either a 66 kV line, evacuating a maximum of 85MW and/or a 132 kV line, evacuating a maximum of 155 MW.
Area occupied by both permanent and construction laydown areas	Laydown areas used are the same as for the WEF.
Area occupied by buildings	Control and office buildings located next to the substation will cover a maximum of 0.5 hectares
Length of service road	20 km
Width of service road	3 - 4 m wide
Proximity to grid connection	20 km
Height of fencing	2.4 m only around on-site substation
Type of fencing	Wired mesh / chain link fence not electrified

Table B: DEA Information Requirements - Site Maps and GIS Information

Site Maps and GIS Information	Section of this Report
All maps/information layers are provided in ESRI Shapefile format.	
All affected farm portions must be indicated.	Figure 1.3 Highlands South Grid Connection
The exact site of the application must be indicated (the areas that will be occupied by the application).	Figure 1.1 Site Location Figure 1.3 Highlands South Grid Connection
A *status quo* map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	Volume II: Specialist Report
Agricultural fields	Volume II: Specialist Report
Grazing areas	Volume II: Specialist Report

Site Maps and GIS Information	Section of this Report
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	Volume II: Specialist Report
Critically endangered and endangered vegetation areas that occur on the site	Figure 12.1 Ecological Sensitivity
Bare areas which may be susceptible to soil erosion	No specific bare areas have been identified. During construction phase, vegetation removal will be confined to the smallest possible footprint, runoff will be controlled and site-specific measures will be devised for any potentially high risk areas.
Cultural historical sites and elements	Figure 12.1 Environmental Sensitivity
Rivers, streams and water courses	Volume II: Specialist Report
Ridgelines and 20 m continuous contours with height references in the GIS database	Volume II: Specialist Report
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	Volume II: Specialist Report
High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	Figure 12.1 Environmental Sensitivity
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 12.1 Environmental Sensitivity
Indicate isolated residential, tourism facilities on or within 1 km of the site	Volume II: Specialist Report
A slope analysis map/layer that include the following slope ranges: **Less than 8% slope (preferred areas for turbines and infrastructure)** **Between 8% and 12% slope (potentially sensitive to turbines and infrastructure) Between 12%and 14% slope (highly sensitive to turbines and infrastructure)** **Steeper than 18% slope (unsuitable for turbines and infrastructure)**	Volume II: Specialist Report
A map/layer that indicate locations of birds and bats including roosting and foraging areas	Volume II: Specialist Report

Site Maps and GIS Information	Section of this Report
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 elements which they serve (to make commenting on sections possible).**	Figure 1.3 Highlands South Grid Connection
River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.	Figure 1.3 Highlands South Grid Connection
Substation(s) and/or transformer(s) sites including their entire footprint.	Figure 1.3 Highlands South Grid Connection
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).	Figure 1.3 Highlands South Grid Connection
Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill	Pylons will be placed to minimise required cut and fill.
Borrow pits	No borrow pits on site. Licenced 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 C: Geographic Coordinates of Linear activities to be authorised

Alternative	Start coordinates	Middle coordinates	End coordinates
Alternative 1 (Preferred)	32°47'2.48"S; 25°21'40.14"E	32°44'10.26"S 25°21'7.40"E	32°41'25.08"S; 25°21'48.69"E
Alternative 2	32°47'2.48"S; 25°21'40.14"E	32°44'5.27"S; 25°21'5.49"E	32°41'25.08"S; 25°21'48.69"E

TABLE OF CONTENTS

Figure List

1 INTRODUCTION

Arcus Consultancy Services South Africa (Pty) Ltd was appointed by WKN Windcurrent South Africa (Pty) Ltd (the Developer) to conduct the Basic Assessment (BA) process as required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, for the proposed establishment of an overhead power line which will form the grid connection for the proposed Highlands South Wind Energy Facility (WEF). The overall aim of the project is to generate electricity, which is likely to be sold through the Department of Energy's (DOE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The grid connection will deliver electricity from the proposed Highlands South WEF into the existing Eskom electricity grid. The proposed development site is situated within the Cookhouse Renewable Energy Development Zone (Figure 1.1).

By way of context, it should be noted that there are six components to the proposed Highlands Wind Energy Facility developments, comprising of three WEFs and their associated grid connections (Figure 1.2).

For the purpose of obtaining Environmental Authorisation (EA), and bidding requirements in the Department of Energy's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), the project has been split into three phases: North, Central and South. A Special Purpose Vehicle (SPV) has been set up for each of the three phases. Each phase will consist of two applications: one for the wind energy facility and one for the respective grid connection. The Proposed Development therefore consists of six components and six separate applications for EA:

- Highlands North Wind Energy Facility (RF) (PTY) Ltd:
  - Highlands North WEF consisting of up to 17 turbines with a generating capacity of up to 5 MW each;
  - Electrical Grid Connection and Associated Infrastructure for the Highlands North WEF;
- Highlands Central Wind Energy Facility (RF) (PTY) Ltd:
  - Highlands Central WEF: up to 14 turbines with a generating capacity of up to 5 MW each;
  - Electrical Grid Connection and Associated Infrastructure for the Highlands Central WEF;
- Highlands South Wind Energy Facility (RF) (PTY) Ltd:
  - Highlands South WEF: up to 18 turbines with a generating capacity of up to 5 MW each;
  - **Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF**.

This report pertains to the **Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF** (Figure 1.3).

1.1 Purpose and Structure of this Report

The purpose of this Basic Assessment (BA) Report is to present the environmental impact assessment process undertaken on the preferred alternative for the proposed development. The preferred site, layout, and technical specifications were assessed by the specialists and their findings and assessment are collated in this BA report. This BA report will provide sufficient information for the competent authority to make an informed

decision on the proposed development. The report further addresses comment received during the public participation process.

The BA Report is set out in three volumes:

Volume I: BA Report

Volume II: Specialist Reports

Volume III: Comment & Response Report

Table 1.4: Structure of this Report

Section	Title	Containing
1	Introduction	Aims and Purpose of the BA Report, Overview of the BA process, the requirements of the DEA, the details of the developer, details of the EAP and the assumptions and limitations of the study.
2	Environmental Legal Framework	National Environmental Legislation, International Conventions and Treaties, Policies and Guidelines.
3	Methodology	Specialists Studies Methodology, Assessment Techniques for the BA
4	Public Participation	Initial Notification, BA Phase Public Participation, Summary of Issues.
5	Need and Desirability	Description of the Need and Desirability of the Proposed Development.
6	Assessment of Alternatives	A Comparative Analysis of Site, Technology, Location, Design and the No-Go Alternatives.
7	The Preferred Alternative	Description of the Proposed Development
8	Description of the Baseline Environment	A Detailed Description of the Affected Environment, including Freshwater and Wetlands, Flora, Fauna, Avifauna, Bat, Ambient Noise, Visual, Heritage, Social, Soil and Traffic.
9	Assessment of Potential Impacts	A Detailed Assessment of the Potential Impacts During the Construction, Operational and Decommissioning Phases.
10	Assessment of Cumulative Impacts	A Detailed Assessment of the Potential Cumulative Impacts.
11	Summary of Findings, Recommendations and Conclusions	A summary of the Finding of the Impact Assessment, Recommendations and Conclusions.
12	Impact Statement	A summary of the key findings of the environmental impact assessment of the proposed development.
Appendix A	EAP Declaration of Independence and CV	Commissioner of Oaths EAP Declaration of Independence and CV of the EAP.
Appendix B	Environmental Management Programme	The Environmental Management Programme, detailing the Proposed Mitigation Measures, and the Roles and Responsibility of Management during the Construction, Operation and

Section	Title	Containing
		Decommissioning of the Proposed Development.

1.2 Overview of the Basic Assessment Process

A Basic Assessment (BA) process 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 BA process should identify activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement.

An independent Environmental Assessment Practitioner (EAP) and specific specialists identify potential negative and positive impacts that could arise as a result of the proposed project and mitigation measures are recommended which would allow for the avoidance or reduction of negative impacts or which may enhance positive impacts.

The key phases of this BA process are described below:

- **Initial Notification and Call to Register as I&APs through the following:** Advertisements, site notices, posters, letters to landowners and pre-identified I&APs. The aim of this step is to inform people of the proposed activity and to encourage initial comment and feedback.

- **Basic Assessment Process: Collation of initial comments and specialist investigations into a concise report (this document) which provides feedback on the following:**
  - Nature of the activity;
  - Description of the receiving environment;
  - Identification of potential feasible alternatives;
  - Identification of potential positive and negative impacts; and
  - Identification of knowledge gaps.

This Basic Assessment process has involved an initial feasibility investigation by the specialists of the proposed development area, which identified areas suitable for development as well as environmental constraints, which fed into the design of the proposed facility layout and grid connection alternatives. The proposed turbine layout and grid connection options therefore represents the preferred alternative layout.

The identified impacts have been assessed and relevant management and mitigation measures have been included in an Environmental Management Programme (EMPr). The findings are included in this Report.

- **Ongoing Public Consultation:** Throughout the process, registered Interested and Affected Parties (I&APs) are consulted. This involvement was initiated through the dissemination of information by means of advertisements, notification letters, posters and site notices. Opportunities are provided for I&APs to review the Draft and Final Basic Assessment Reports.

Following the completion of the relevant processes described above and the submission of documentation to the competent authority (DEA), the DEA will review the application and issue a decision (called an Environmental Authorisation). I&APs will be informed of the decision and their rights to appeal.

1.3 The Developer

WKN-Windcurrent South Africa (Pty) Ltd (WKN-WC) is a South African registered company dedicated to the development of wind energy projects to supply energy to the national grid.

In accordance with the REIPPP bid requirements WKN-WC has established Highlands South Wind Energy Facility (RF) (Pty) Ltd as a Special Purpose Vehicle (SPV) that will be used to own all the authorisations, contracts, permits and licenses required to lawfully build and operate the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF.

1.4 The Environmental Assessment Practitioner

The co-ordination and management of this BA process is being conducted by Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') with the lead EAP being Ashlin Bodasing. Refer to Appendix A for the EAP's Declaration of Interest and *Curriculum Vitae*.

Ashlin Bodasing

Qualifications	Bachelor of Social Science (Geography and Environmental Management)
Experience in Years	13 years
Experience	Ashlin Bodasing is the Technical Director at Arcus, located in Cape Town. Having obtained her Bachelor of Social Science Degree from the University of Kwa-Zulu Natal; she has over 13 years' experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management, environmental impact assessments and public participation. She has also been actively involved in a number of industrial and infrastructural projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment and as well green field coal mines, as well as renewable energy facilities, both wind and solar. Ashlin has major project experience in the development of Environmental Impact Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies. Experience also includes International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental reviews. She has worked in Mozambique, Botswana, Lesotho and Zimbabwe.

Anja Albertyn

Qualifications	Master of Science (Zoology)
Experience in Years	8 years
Experience	Anja Albertyn has worked at Arcus since November 2013. She is registered with SACNASP as a professional natural scientist in the field of ecological science. She has worked as a consultant since February 2009, when she oversaw a large-scale ballast water treatment testing project for an environmental consultancy in Cape Town for over two years. Since then she has worked on over 22 renewable energy development projects. Anja is involved in all aspects of environmental impact assessments, avifaunal specialist studies, and also functions as Arcus' GIS specialist in Cape Town. She holds a Master of Science in Zoology (Ornithology) from the Percy FitzPatrick Institute of African Ornithology at the University of Cape Town. She is currently in the position of Avifauna Specialist and Environmental Assessment Practitioner.

Arcus is a specialist environmental consultancy providing environmental services to the renewable energy market. Arcus has advised on over 150 renewable energy projects in

the United Kingdom and South Africa, with environmental management and in-house specialist services.

1.5 The Specialists

The EAPs have assembled a team of technical specialists to undertake studies for the proposed Highlands Wind Energy Facilities.

The specialists' fields of investigation are listed below. The areas of investigation have been identified as relevant to the proposed development as per the experience of the EAP, and consultation with the listed specialists who are familiar with the locality and nature of development.

These specialists have been selected based on their experience in the field of EIA and of renewable energy projects, and the locality of the proposed development.

Name	Organisation	Role
Andrew Pearson	Arcus Consultancy Services	Bird Impact Assessment and Monitoring
Jonathan Aronson	Arcus Consultancy Services	Bat Impact Assessment and Monitoring
Michael Reid	Arcus Consultancy Services	Noise Impact Assessment
Simon Todd	3 Foxes Consulting	Terrestrial Ecological Impact Assessment (Flora and Fauna)
Dr Jayson Orton	ASHA Consulting	Cultural Heritage and Archaeology Impact Assessment
Dr John Almond	via ASHA Consulting	Palaeontology Impact Assessment
Dr Brian Colloty	Scherman Colloty and Associates	Freshwater and Wetlands Impact Assessment
Quinton Lawson & Bernard Oberholzer	Quinton Lawson & Bernard Oberholzer Architects	Landscape and Visual Impact Assessment
Johann Lanz	Johann Lanz Soil Scientist	Geology, Soils and Agriculture Impact Assessment
Tony Barbour	Tony Barbour Environmental Consulting and Research	Socio-Economic Impact Assessment
Stephen Fautley	TechSO	Traffic Impact Assessment

1.6 Assumptions and Limitations

The following assumptions and limitations are applicable to the Highlands South Grid Connection:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- It should be emphasised that information, as presented in this report, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.
- The assumptions and limitations, presented in each specialist reports, Volume II of this report, are noted for the BA Report and the specialist studies conducted as part of the EIA process for the proposed development.
- It is assumed that the corridor investigated and assessed for the proposed powerline is technically suitable for such development.

- It is assumed that the connection to the national grid via Eskom's existing transmission line and nearby substations is technically adequate, feasible and viable.
- Power generation alternatives were not investigated due to the fact that this application is project specific i.e. electricity distribution from a renewable resource.
- The assumption is made that the information on which this report is based (specialist studies and project information, as well as existing information) is accurate and correct at the time of writing this report.
- It is assumed that the recommendations derived from this study would be included in all tender documentation and the EMP for implementation.
- This study does not analyse the impact of borrow pits. Contractors would be expected to provide services with all necessary approvals in place.

2 ENVIRONMENTAL LEGAL FRAMEWORK

2.1 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 proposals that may significantly affect the environment. Included amongst the key principles is the principle that all development must be socially, economically and environmentally sustainable, 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 also provides for the participation of I&APs and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA 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.

In order 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.

On 7 April 2017 the Minister of Environmental Affairs published amendments to the NEMA: EIA Regulations of 2014 (GNR 326) and the three Listing Notices (GNR 324, 325 and 327) in Government Gazette No. 40772. This amendment was promulgated under the NEMA: EIA Regulations 2014 published by the Minister of Environmental Affairs in Government Gazette No. 38282 on 8 December 2014. The 2014 EIA Regulations in turn were promulgated under the requirements of Chapter 5 of the NEMA.

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 Environmental Affairs (DEA).

The DEA is the competent authority for all renewable energy proposals, as NEMA 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;

This project has implications for international environmental commitments that South Africa has made in terms of climate change.

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 DEA 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 2.1 below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this BA process.

Table 2.1: NEMA Listed Activities in Relation to the Proposed Development

Listing Notices 1 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.*	132 kilovolt overhead powerlines will be installed to transfer electricity from the on-site substation to the existing on-site Eskom transmission line.
Listing Notice 1 GN R 327 Activity 19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*	The construction of the overhead powerline will include the excavation of soil within 32 metres of a watercourse, and infilling/deposition may exceed 5 cubic metres and in some instances may exceed 10 cubic metres. Borrow pits for the sourcing of aggregate material will be required.
Listing Notice 1 GN R 327 Activity 27	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation*	The infrastructure associated with the overhead powerline will require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 3 GN R 324 Activity 4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres a. Eastern Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Servitude road will be wider than 4 m. The site falls outside of an urban area and parts of the site fall with a NPAESF and a Tier 2 CBA.
Listing Notice 3 GN R324 Activity 14	*The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has*	Bridges and infrastructure associated with the overhead powerline will be constructed within 32 m of a watercourse(s). The site lies outside of an urban area and a portion of the site falls with an NPAESF area and a Tier 2 Critical Biodiversity Area.

Listing Notices 1 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; *a. Eastern Cape* *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	
Listing Notice 3 GN R324 Activity 23	*The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *a. Eastern Cape* *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	The construction of the overhead powerline will include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse. The site lies outside of any urban area, and parts of the site fall within a Critical Biodiversity Area.

2.2 The National Heritage Resources Act, 1999 (Act No 25 of 1999)

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 5000 m² in extent."

The NHRA 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, 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) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account any comments and recommendations made by the relevant heritage resources authority. As such, a Heritage Impact Assessment (HIA) will form part of this Basic Assessment process.

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 also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage, which must be considered in any heritage assessment, includes:

- *Any place of cultural significance (described below);*
- *Buildings and structures (greater than 60 years of age);*
- *Archaeological sites (greater than 100 years of age);*
- *Palaeontological sites and specimens;*
- *Shipwrecks and aircraft wrecks; and*
- *Graves and grave yards.*

Section 3(3) of the NHRA defines the cultural significance of a place or objects with regard to the following criteria:

a. *Its importance in the community or pattern of South Africa's history;*
b. *Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;*
c. *Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;*
d. *Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;*
e. *Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;*
f. *Its importance in demonstrating a high degree of creative or technical achievement at a particular period;*
g. *Its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;*
h. *Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and*
i. *Sites of significance relating to the history of slavery in South Africa.*

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 (clause "e" above).

The heritage impact assessment reports have been submitted to the SAHRA for comment.

2.3 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 salinisation 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.

2.4 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 Environmental Affairs") 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 prohibits anyone from causing a disturbing noise.

No provincial noise control regulations have been promulgated in the Eastern Cape Province and thus the National Noise Control Regulations are relevant for the construction phase of the Highlands South WEF Grid Connection.

2.5 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 the WEF.

2.5.1 National Dust Control Regulations, 2013

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

The acceptable dust fall out rates are:

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

2.6 National Water Act, 1998 (Act No. 36 of 1998)

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 proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, which will require access roads over watercourses and drainage channels, in terms of Section 21 of the Act include, but are not limited to, the following:

Section 21(c): Impeding or diverting the flow of water in a watercourse; and
Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.

GN 1199 of 18 December 2009 grants general authorisation for the above water uses based on certain conditions. It is 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.

Highlands South WEF (RF) (Pty) Ltd is applying for a Water Use License, and proof of the application process is provided in Appendix C.

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

2.7.1 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 bird species that occur on the site may be threatened or protected.

2.7.2 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.

2.8 Cape Nature and Environmental Conservation Ordinance 19 of 1974

These were developed to protect both animal and plant species which warrant protection. These may be species which are under threat or which are already considered to be endangered and species are listed in the relevant documents. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation.

2.9 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 BA 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 Forest Act, 1998 (Act No. 84, 1998);*
- *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;*
- *Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);*
- *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).*

2.10 Conventions and Treaties

2.10.1 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.

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.

2.10.2 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.

2.10.3 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*".

2.10.4 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.

2.11 Policies and Guidelines

2.11.1 Environmental Impact Assessment Guidelines

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

- IEM Guideline Series (Series 3): Stakeholder engagement (2002);
- IEM Guideline Series (Series 4): Specialist studies (2002);
- IEM Guideline Series (Series 5): Impact Significance (2002);
- IEM Guideline Series (Guideline 5): Companion to the EIA Regulations 2010 (October 2012);
- IEM Guideline Series (Series 7): Cumulative Effects Assessment (2002);
- IEM Guideline Series (Guideline 7): Public Participation in the EIA process (October 2012);
- IEM Guideline Series (Series 7): Alternatives in the EIA process (2002);
- IEM Guideline Series (Guideline 9): Draft guideline on need and desirability in terms of the EIA Regulations 2010 (October 2012);
- DEA (2017) Guideline on Need and Desirability, Department of Environmental Affairs (DEA) Pretoria, South Africa (2017);
- IEM Guideline Series (Series 12): Environmental Management Plans (EMP) (2002); and
- IEM Guideline Series (Series 15): Environmental impact reporting (2002).

2.12 Impact Assessment and Reporting

The primary objective of the basic assessment process is to present sufficient information to the competent authority (CA) and interested and affected parties (I&APs) on predicted impacts and associated mitigation measures required to avoid or mitigate negative impacts, as well as to improve or maximise the benefits of the project.

In terms of legal requirements, NEMA EIA Regulations regulate and prescribe the content of the BA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 2.2 shows how and where the legal requirements are addressed in this BA Report. Volume III of this BA Report contains the PPP undertaken to date. As the comments are received on the Draft BA Report these will be collated and included in the comments and response report.

The BA Report presents a summary of the findings and recommendations of all specialists.

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

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

b) identify the alternatives considered, including the activity, location and technology alternatives;

c) describe the need and desirability of the proposed alternatives;

d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine-

i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

ii. 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; and

e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-

i. identify and motivate a preferred site, activity and technology alternative;

ii. identify suitable measures to avoid, manage or mitigate identified impacts; and

iii. identify residual risk that need to be managed or monitored.

The above activities are completed through consultation with:

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

The existing environment within which a proposed development is to be located is investigated, through a review of relevant background literature and ground-truthing.

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

Table 2.2: Legislative Requirements for Scope of Assessment and Content of Basic Assessment Reports

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	**Location in BAR**
details of- *(i) the EAP who prepared the report; and* *(ii) the expertise of the EAP, including a curriculum vitae;*	Section 1.4 Appendix A
the location of the activity, including- *(i) the 21 digit Surveyor General code of each cadastral land parcel;* *(ii) where available, the physical address and farm name;* *(iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;*	Table A Figure 1.3 Table 7.1
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- *(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or* *(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;*	Figure 1.3 Table 7.1
a description of the scope of the proposed activity, including- *(i) all listed and specified activities triggered and being applied for; and* *(ii) a description of the activities to be undertaken including associated structures and infrastructure;*	Table 2.1 Section 7
a description of the policy and legislative context within which the development is proposed including- *(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and* *(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools framework, and instruments;*	Section 2 Section 5
a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 5
a motivation for the preferred site, activity and technology alternative;	Section 6
a full description of the process followed to reach the proposed preferred alternative within the site, including- *(i) details of the alternatives considered;*	Section 6
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 4 Volume III
(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 4
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- *(aa) can be reversed;*	Section 9

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
(bb) may cause irreplaceable loss of resources; and *(cc) can be avoided, managed or mitigated;*	
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 3.3 Volume II: Specialist Reports
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9
(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 9
(ix) the outcome of the site selection matrix;	Section 6
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 6
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Section 6 Section 7
a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including - *(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and* *(ii) 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 3 Section 9
an assessment of each identified potentially significant impact and risk, including- *(i) cumulative impacts;* *(ii) the nature, significance and consequences of the impact and risk;* *(iii) the extent and duration of the impact and risk;* *(iv) the probability of the impact and risk occurring;* *(v) the degree to which the impact and risk can be reversed;* *(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and* *(vii) the degree to which the impact and risk can be avoided, managed or mitigated;*	Section 9 Section 10
where applicable, a summary of the findings and impact management measures identified in 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 11
an environmental impact statement which contains- *(i) a summary of the key findings of the environmental impact assessment;* *(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and* *(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*	Section 11 Section 12 Figure 11.1
based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management outcomes, and the impact management outcomes for the development for inclusion in the EMPr;	Section 9 Appendix B: EMPr
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	Section 12.1

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
authorisation;	
a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.6
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 12
where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Commencement of construction will occur within 10 years of authorisation and conclude within 5 years of commencement. Post-construction monitoring requirements will be finalised within this period.
an undertaking under oath or affirmation by the EAP in relation to- *(i) the correctness of the information provided in the reports;* *(ii) the inclusion of comments and inputs from stakeholders and I&APs;* *(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and* *(iv) 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
where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	n/a
any specific information that may be required by the competent authority; and	n/a
any other matters required in terms of section 24(4)(a) and (b) of the Act.	n/a

3 METHODOLOGY

3.1 Feasibility Assessment

The Developer appointed Arcus to conduct a Feasibility Study for the Highlands Wind Energy Facilities in 2017.

This feasibility assessment involved:

- Conducting site visits to confirm desktop reviews, where necessary;
- Adding environmental and planning designations (e.g., landscape, nature conservation, archaeology);
- Identifying other designations of relevance; e.g.; regional renewable targets;
- Identifying nearby windfarm proposals and status;
- Identifying key biophysical constraints and / opportunities and potential red flags;
- Identifying key socio-economic constraints and / opportunities and potential red flags;
- Production of a preliminary overall environmental sensitivity map;
- Production of a preliminary biophysical sensitivity map; and

- Comment on the feasibility of the proposed development given the potential environmental impact and constraints and buffers applied.
- Identifying the potentially developable area within the available land; and
- Providing a list of key issues and conclusions.

The results of the feasibility assessment were used to develop the proposed site layout.

3.2 Specialist Study Assessment

Specialists were appointed by Arcus to provide a detailed report based on the requirements of this proposed development.

Methodology of each specialist used to collate the report(s) can be seen in each Specialist Report attached to this BA as Volume II.

3.3 Assessment Techniques for the BA

Each of the specialist assessments follows a systematic approach to the 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.

3.3.1 Baseline Description

In order to evaluate the potential environmental impacts, information relating to the existing environmental conditions were collected through field and desktop research; this is known as the baseline. 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.

The baseline was used to determine the sensitivity of receptors on and near the proposed development site and what changes may take place during the construction, operation and decommissioning of the proposed development and the impacts, if any, that these changes may have on these receptors.

Data was collected from public records and other archive sources and where appropriate field surveys were carried out as detailed.

3.3.2 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.

The project team have experience from environmental studies for other projects in the locality of the proposed development as well as other WEFs. The team are therefore able to identify potential impacts addressed in the BA based on their experience and knowledge of the type of development proposed and the local area. Their inputs informed the scope for the BA.

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.

3.3.3 Assessment of Potential Effects

The potential impact that the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and 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).

Specialists, in their terms of references were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. The methodology[3] is outlined below.

The table below, taken from the above guideline, indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the revised 2014 EIA Regulations (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

3.3.3.1 Extent (spatial scale)

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

3.3.3.2 Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

[3] Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

3.3.3.3 Intensity (severity)

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be violated (e.g. pollution)	Measurable deterioration Recommended level will occasionally be violated	No measurable change; Recommended level will never be violated	No measurable change; Within or better than recommended level.	Measurable improvement	Measurable improvement

3.3.3.4 Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

3.3.3.5 Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

3.3.3.6 Degree of Confidence in Predictions:

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

3.3.3.7 Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	

	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	M	H
		Extent		

Positive impacts are ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

3.3.3.8 Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	**Definite Continuous**	H	MEDIUM		HIGH
	Possible Frequent	M		MEDIUM	
	Unlikely Seldom	L	LOW		MEDIUM
			L	M	H
			CONSEQUENCE		

3.3.3.9 Mitigation

Measures to avoid, reduce or remedy significant adverse impacts 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 the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant).

3.4 Cumulative Impact Assessment

In accordance with the EIA Regulations, consideration is also given to 'cumulative impacts'.

By definition, 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 the purpose of this assessment cumulative impacts is defined and has been assessed in the future baseline scenario, i.e. Cumulative impact of the proposed development = change caused by proposed development when added to the cumulative baseline (The cumulative baseline includes all other identified developments. In the cumulative assessment the effect of adding the proposed development to the cumulative baseline is assessed.)

In line with best practice, the scope of this assessment will include all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 km radius of the site (as a minimum).

The WEF sites included in the assessment of cumulative impacts has been based on the knowledge and status of the surrounding areas at the time of writing the BA Report.

Each of the specialists used existing publicly available information for the developments that occur within 35 km of the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, in order to assess the cumulative impacts. Cumulative impacts that have been considered are those residual impacts that remain medium to high post mitigation. It should be noted that this assessment is highly qualitative and based on specialists' knowledge.

4 PUBLIC PARTICIPATION

This Public Participation Process follows the requirements of Regulation 41, 42, 43 and 44 of GN R. 326 Amendments to the Environmental Impact Assessment Regulations, 2014 (7 April 2017), promulgated under Section 24 (5) of the National Environmental Management Act (Act 107 of 1998 – NEMA), as amended.

The primary aims of the public participation process are:

- To inform Interested and Affected Parties (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 facilitate open dialogue and liaise with all I&APs;
- 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 a Comments & Response Report.

Volume III of this report contains the Comments & Response Report which includes copies and proof of all correspondence.

A combined public participation process was followed for the six applications, due to their interlinked nature. Any comments related specifically to an individual component was only included in that application's issues trail.

4.1 Initial Notification

An I&AP database (Volume III - Appendix 1) was compiled consisting of project landowners, surrounding landowners within 5 km, and relevant stakeholders of the Proposed Development Site boundary, identified organs of state and organisations. This database has been updated throughout the duration of the basic assessment process and anyone with an interest in the proposed development was encouraged to register.

On 14 June 2018 initial notification letters (email and registered mail in English and Afrikaans) were sent to I&APs on the database, informing them of the intention of the applicant to apply for Environmental Authorisations for the proposed development (Volume III - Appendix 2). This included a locality map, proposed development plan and project descriptions. Details of how to submit comments and queries were included.

Site notice boards in English and Afrikaans were placed where the site boundary meets the R63 at 32°41'23.8"S 25°21'54.7"E and 32°41'23.8"S 25°21'54.7"E on 15 June 2018 (Volume III - Appendix 3).

Notification posters in English and Afrikaans, encouraging I&APs to register on the database were placed on notice boards in Pearston at the post office, municipality, library, SAPS and a local supermarket on 15 June 2018 (Volume III - Appendix 3).

In Somerset East notification posters were placed on notice boards at the SAPS, Langenhoven library, municipality, Spar supermarket, a hardware shop and a café. Photographs and coordinates are presented in Volume III - Appendix 3.

Newspaper advertisements in English and Afrikaans were placed in *The Daily Sun* Eastern Cape and *The Mid Karoo Express* on 21 June 2018 (Volume III - Appendix 4).

4.2 BA Process Public Participation

The following tasks were undertaken during the Basic Assessment process:

- Notification letters were sent out to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the Basic Assessment Report (BAR) for review and comment (30 days) (Volume III - Appendix 5);
- Notification letters were sent to all registered I&APs, key stakeholders, and organs of state to inform them of the extension of the commenting period on the Basic Assessment Report (BAR) by five working days (seven calendar days) (Volume III - Appendix 6);
- E-mails were sent to landowners and adjacent landowners requesting contact details of their properties occupiers in order to arrange focus group meetings (Volume III - Appendix 8);
- Where no response to the e-mail was received phone calls were made to surrounding landowners requesting occupier details and assistance in arranging focus group meetings (Volume III - Appendix 8);
- Focus Group Meetings were held with occupiers project landowners and adjacent properties (Volume III - see Section 4 & Appendix 8)
- A Comments and Reponses Report was compiled and updated, recording comments and/or queries received and the responses provided (Volume III - Section 5). Copies of all original comments received and responses sent are included in Volume III - Appendix 7 - 10.

4.3 Summary of Issues Raised

Copies of all comments received from the public during the process, the review of the Draft Basic Assessment Report, and any public meetings held will be collated in Volume III (Comments and Responses Report), which documents the issues raised and project team responses to the comments received. The original comments are included in Volume III.

Birdlife has commented on the proposed Highlands wind energy facilities and made recommendations for mitigation measures for the grid connection, which are included in the EMPR and Comments & Response Report.

No comments pertaining specifically to the proposed grid connection were received from public I&APs. Comments received pertaining to the Highlands wind energy facilities including grid connections have been included and responded to in the Comments & Response Report.

5 NEED AND DESIRABILITY

The proposed grid connection is required to transfer electricity generated by the Highlands South WEF to the national grid. The proposed grid connection and Highlands South WEF therefore rely on authorisation of the other to move forward.

The need for the proposed grid connection is linked to the need for the Highlands South WEF. The questions for need and desirability of the proposed grid connection are therefore answered in the context of being a component of a renewable energy facility.

Reference is made to the Department of Environmental Affairs (DEA) 2017 Guideline on Need and Desirability[4] 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 assessment answers the question of whether the activity or development is being proposed at the right time in the right place. The guidelines pose questions that should be considered in this investigation, which are addressed in Table 5.1 and Table 5.2 below.

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

Table 5.1: Ecological Considerations of Need and Desirability for Highlands WEF

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?		An independent Ecological Specialist forms part of the project team. The Ecological Specialist's approach and methodology applied complies with NEMA: EIA Regulations 2014 as amended as well as best practise guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers *et al.* (2005). The ecological specialist study states: Although there are extensive areas of sensitive habitat within the wider Highlands site, the development footprint is restricted to the medium and low sensitivity parts of the site. These areas are considered suitable for development and there are no impacts associated with the Highlands WEF that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layouts provided for the assessment, the Highlands North, Central and South WEFs can be supported from a terrestrial ecology point of view.	Volume II: Fauna & Flora Specialist Basic Assessment
How were the following ecological integrity considerations taken into account?	*Threatened Ecosystems*	The National List of Threatened Ecosystems (2011) was used to identify and map listed ecosystems in need of protection. No threatened ecosystem falls within the site boundary.	Volume II: Fauna & Flora Specialist Basic 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 areas of high and very high ecological sensitivity.	Volume II: Fauna & Flora Specialist Basic Assessment
	Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")	Critical Biodiversity Areas (CBAs) were extracted from the Eastern Cape Conservation Plan. The portion of the Highlands South Grid Connection falls within a Tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape; Even though the development would result in some habitat loss within the CBA this is not likely to compromise the overall functioning of the CBA as it is very large and the	Volume II: Fauna & Flora Specialist Basic Assessment

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

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
		development occupies a very small portion of the CBA.	
	Conservation targets	The majority of the development footprint falls within the Camdeboo Escarpment NPAES Focus Area, indicating that the area has been identified as a potential target for the protected area expansion. The Camdeboo Escarpment Focus area is over 421 000 ha in extent and the loss of less than 10 000 ha from this focus area is not considered highly significant	Volume II: Fauna & Flora Specialist Basic Assessment
	Ecological drivers of the ecosystem	The key ecological drivers of ecosystems on the site and in the vicinity were assessed by the Ecological Specialist. The specialist concludes that the potential for disruption of broad-scale ecological processes and their drivers is low with recommended mitigation measures.	Volume II: Fauna & Flora Specialist Basic Assessment
	Environmental Management Framework	No area-specific Environmental Management Framework exists for the site. The Sarah Baartman District Municipality IDP and the Cacadu District Municipality SDF provide environmental management goals and strategies. The proposed Highlands South Grid Connection complies with all policies and planning tools.	Volume II: Social Impact Assessment
	Spatial Development Framework	The Cacadu District Municipality SDF highlights the following points relevant to the development: • The districts economy is dependent on the natural resources of the area; • The SDF should identify areas for renewable energy production; • Spatial planning must recognise that game reserves and farming are playing a bigger role in the economy; • Inappropriate land use change can have a negative impact on district resources and the economy; • The introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district. (Potential changes to the visual and cultural landscapes); • The protected area network together with the intended expansion areas (Nature reserves and parks) provide significant and expanding ecotourism opportunities within the District; • Both the tourism and productive components of the economy are dependent on	Volume II: Social Impact Assessment page 19-21

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
		effective access. (Transportation infrastructure). The location of the proposed WEF does not appear to conflict with the land use planning objectives contained in the SDF. The site does not appear to be located within a Tourism Focus Area or a Protected and Critical Biodiversity Area. In terms of land use, the site is located in an area designated as grazing potential. The area to the north of the site is however identified as a Tourism Focus area.	
	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 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.	Volume II: Social Impact Assessment; Bird Impact Assessment; Bat Impact Assessment
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?		Before the start of the Basic Assessment process detailed specialist feasibility 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 was produced that avoids sensitive areas and identified constraints. This layout was then assessed by the specialists in their Basic Assessment specialist reports presented here. The specialists 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 each phase of 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
What waste will be generated by this development?		The generation of waste will largely be restricted to the construction phase of the project	

"securing ecological sustainable development and use of natural resources"[5]		
Question	**Answer**	**Reference**
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?	and consist of normal construction phase solid waste streams. The EMPr details 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.	
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?	A visual feasibility study was conducted to identify no go areas and areas most visually suitable for development. Visual buffers were applied to prominent topographic features, steep slopes, water features, roads, nature reserves and protected areas, private nature reserves, game farms, guest farms and resorts, farmsteads, towns, settlements and cultural landscapes / heritage sites. The development layout was produced by avoiding turbine placement within these visual buffers. A Heritage Impact Assessment and a Visual Impact Assessment were conducted to assess the developed layout. Comment from the relevant heritage authorities is being sought. Mitigation measures have been identified by the heritage specialists to minimise and remedy residual impacts, and enhance positive impacts, including: • Monitoring of all substantial excavations for fossil material on an on-going basis during construction; • Application of Chance Fossil Finds Procedure; • A 30 m buffer around all graves, ruins and buildings to be maintained and if not possible features to be cordoned off for their protection • Final walkdown survey of the authorised footprints to be carried out at least 6 months prior to start of construction in order for any archaeological mitigation to be carried out if required; • If any archaeological material or human burials are uncovered then work in the immediate area is to be halted. The fund is to be reported to the heritage authorities and may require inspection, excavation and curation in an approved institution; • Substation & O&M buildings to be located in visually unobtrusive positions or screened with earth berms and planting; • Location of the construction camp, batching plant and related storage/stockpile areas in unobtrusive positions in the landscape, away from arterial or district roads, or alternatively screening measures utilized. • Clear demarcation of construction camps, limited in size to only that which is essential. • Employment of dust suppression and litter control measures. Formulation and adherence	Volume II: Heritage Impact Assessment & Visual Impact Assessment

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
		to an Environmental Management Programme (EMPr), monitored by an Environmental Control Officer (ECO). • Areas disturbed during construction to be rehabilitated to original state.	
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. Some non-renewable resources will be consumed during the construction phase. These include hydrocarbons to be used as fuel, and soil to be removed for turbine foundations and compacted for hard-standings. Relatively few non-renewable resources will be consumed during operation.	
How will this development use and/or impact on renewable natural resources and 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		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.	
	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	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 dependant 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. The proposed WEF lies within a Renewable Energy Development Zone for wind energy.	

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
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?	*quest to improve their quality of life)*		
	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. The opportunity cost of not proceeding with the proposed development is therefore likely to be high.	Agricultural Impact Assessment; Social Impact Assessment
	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The proposed WEF is predicted to reduce dependency on coal as an energy source. Wind as an energy source is not dependant 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. The proposed WEF lies within a Renewable Energy Development Zone for wind energy, and a comprehensive cumulative impact assessment has been conducted.	
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)?*	The faunal component of the study is based on field observations of species and habitats as well as the results the camera trapping. This is supplemented with species records obtained from the various spatial databases and coverages. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many remote areas have not been well sampled with the result that the species lists for an area do not always adequately reflect the actual fauna and flora present at the site	Volume II: Fauna & Flora Specialist Basic 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.	Volume II: Fauna & Flora Specialist Basic Assessment
	Based on the limits of knowledge and the level of risk, how and to what extent was a	In order 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	Volume II: Fauna & Flora Specialist Basic Assessment

"securing ecological sustainable development and use of natural resources"[5]			
Question		**Answer**	**Reference**
	risk-averse and cautious approach applied to the development?	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. Adopting a risk-averse and cautious approach in all stages of the impact assessment allows one to minimise the chance of assessing incorrect information and identifying erroneous impacts. This precautionary approach was utilised throughout the process by all specialists.	
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. A visual feasibility study was conducted to identify no go areas and areas most visually suitable for development. Visual buffers were applied to prominent topographic features, steep slopes, water features, roads, nature reserves and protected areas, private nature reserves, game farms, guest farms and resorts, farmsteads, towns, settlements and cultural landscapes / heritage sites. The proposed development layout was produced by avoiding turbine placement within these visual buffers. The significance of the potential negative health risks posed by the development (noise, shadow flicker, electromagnetic radiation) is low. The noise impact assessment found the level of noise impacts for the Highlands South Grid Connection to be of low to medium significance without mitigation and of low significance with mitigation. Mitigation measures proposed are the installation of turbines with lower noise emission than those assumed (worst case scenario), shutdown of selected turbines at night under relevant wind directions; removal of selected turbines; and /or relocation of farm workers from properties with the greatest noise impact.	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?	The social impact assessment concluded that wind energy has fewer negative health effects than other forms of traditional 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-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?		The findings of the Social Impact Assessment (SIA) indicate that the development of the proposed Highlands WEF will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust will also benefit the local community. The proposed development also represents an investment in clean, renewable 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	Volume II: Social Impact Assessment

"securing ecological sustainable development and use of natural resources"[5]		
Question	**Answer**	**Reference**
	social benefit for society as a whole. The findings of the SIA also indicate that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives. The Highlands WEF site is also located within the Cookhouse Wind REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities. However, a key concern identified during the SIA relates to the visual impacts associated with the wind turbines and the potential impact on existing, well established game farming and hunting operations in the area, specifically the area to the north, east and south of the site. The majority of these operations cater for up-market overseas visitors and the existing "African veld" sense of place represents a key component of their marketing strategy. The establishment of a wind farm on their western boundary would impact on the areas current sense of place, which in turn, may negatively impact on their operations and property values. The potential impacts will be largely confined to four to five existing game farming operations. The potential localised impacts would therefore need to be considered within the context of the location of the Highlands WF within the Cookhouse Wind REDZ and the significant socio-economic benefits associated with the establishment of a renewable energy facility.	
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 can proceed without having any unacceptable negative impacts that cannot be mitigated to a low or medium level of significance. The portion of the Highlands South Grid Connection lies within a tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape. Although the development would result in some habitat loss within the CBA, this is not likely to compromise the overall functioning of the CBA as it is very large and the development occupies a very small proportion of the CBA.	Volume II: Fauna & Flora Specialist Basic Assessment
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?	The initial specialist site feasibility studies identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies and assessments of this layout further refined and improved the proposed development layout resulting in the Final Mitigated Layout, as the best practicable environmental option.	Volume II: Specialist Reports
Describe the positive and negative cumulative	Given that the renewable energy projects in the area are not within viewing distance of	Volume II:

"securing ecological sustainable development and use of natural resources"[5]		
Question	**Answer**	**Reference**
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?	each other and that they form part of a REDZ, the cumulative visual impact significance is considered to be Low (Negative) in the local context. The habitat loss resulting from the development is not likely to be significant, given the low total footprint of wind farm development in relation to the large extent of the affected NPAES focus area. With mitigation, the impact of habitat loss and future ability to meet conservation targets is likely to be of Low Significance. The cumulative effect of all impacts on the avifauna can be mitigated to levels of medium significance. All of the projects have indicated that aquatic impact avoidance as part of their layouts design process coupled mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts while improving the drainage or hydrological conditions within these rivers has been included to result in a cumulative impact that would be negligible. In the worst case scenario the significance of cumulative impacts during construction and operation is expected to be medium without mitigation, and low with mitigation.	Visual Impact Assessment

Table 5.2: Socio-economic Considerations of Need and Desirability

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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,*	A Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa identified eight ***Renewable Energy Development Zones*** (REDZs). The REDZs identified areas where large scale wind energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The proposed Highlands WF falls within the Cookhouse Wind REDZ. The **Eastern Cape Provincial Growth and Development Plan (PGDP)** states that development of infrastructure is a necessary condition to eradicate poverty. Energy demands and electricity infrastructure rollout forms part of the Strategic Infrastructure Programme of the PGDP. The PGDP states that the, "…economic and logistics infrastructure – energy, roads, rail, ports, and air transport among others – is a necessary condition for economic growth and development." Infrastructure development, in turn, will have strong growth promotion effects on the agriculture, manufacturing and tourism sectors by improving market access and by "crowding in" private investment. Poverty alleviation should also be promoted through labour-	Volume II: Social Impact Assessment;

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

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
		intensive and community based construction methods. The high-level objectives of the Strategic Infrastructure Programme include consolidating and building upon the strengths of the Province's globally-competitive industrial sector through the development of world-class infrastructure and logistics capability in the East London and Coega IDZs. A reliable energy supply will be critical to achieving these objectives. The proposed WEF will assist to contribute to the future energy requirements of the Eastern Cape, and its proximity to the Coega IDZs will also benefit these key initiatives. The **Sarah Baartman District Municipality IDP** states that opportunities exist in the renewable energy sector with the area having been identified as one of three preferred locations in the country. It highlights the importance of investing in natural capital, including "creating new generation green jobs and local income streams rooted in renewable energy", developing the skills base, improving connectivity and utility infrastructure, and economic development in the green economy, tourism and skills development and education; The **Blue Crane Route IDP** notes that "wind generation initiatives in the Sarah Baartman District are fast growing with a large number of generation facilities under investigation" and the "the importance of wind energy generation in the district has been confirmed by the announcement by the Department of Energy in terms of successful wind farm developments, as three of the eight approved wind farm developments are to be developed in the district, with an additional wind farm to be developed in Nelson Mandela Bay Municipality." As part of the strategy to address challenges facing the rural areas the Development Bank of Southern Africa initiated the Rural Economic Development Initiative (REDI). The Sarah Baartman REDI, one of three pilot sites in South Africa, is a partnership between SBDM, the Development Bank of Southern Africa (DBSA) and other major stakeholders in the region aimed at identifying and unlocking economic potential to realize the latent economic growth potential of the district. Areas of intervention include (a) agri-innovation primarily in the areas of agro-processing, aquaculture, natural fibre beneficiation; *renewable energy* and agri-tourism and (b) strategy and institutional development. The REDI process has identified a number of catalytic factors that could accelerate economic growth in the District including *renewable energy,* fibre innovation, the potential for agro-processing in key niches, tourism development and growing the education sector. The BCRLM IDP identifies a number of deliverables emanating from REDI. Of relevance to the proposed development are: • Renewable Energy Rapid Assessment and Audit; • Provincial Renewable Energy Coordinating Forum;	

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Question		**Answer**	**Reference**
		• Land Use and Location Policy for Renewable Energy Projects; • Preparation of a Project Plan for the Establishment of a Wind Research and Training Centre in BCRM; • Investigation into the Social Economy and Identification of Interventions to Address Poverty and Unemployment. The primary sector focus of REDI in BCRLM will be on improving the performance of agriculture-related sectors (including priority sectors from phase one research, *renewable energy*, land restoration, agro-tourism and aquaculture). The IDP notes that the BCRLM has identified Local Economic Development (LED) as a key factor in the development of the BCRLM economy and all of its communities The LED strategy identifies six main pillars aimed at stimulating local economic development in Blue Crane Route Municipality. The following are of relevance to the proposed development: • Alternative sources of energy; • Enterprise Development; • Agricultural Development; • Tourism Development; • Investment in Human Capital.	
	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The Sarah Baartman Spatial Development Framework highlights the following: • The districts economy is dependent on the natural resources of the area;; • The SDF should identify areas for renewable energy production; • Spatial planning must recognise that game reserves and farming are playing a bigger role in the economy; • Inappropriate land use change can have a negative impact on district resources and the economy; • The introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district. (Potential changes to the visual and cultural landscapes); • The protected area network together with the intended expansion areas (Nature reserves and parks) provide significant and expanding ecotourism opportunities within the District; • Both the tourism and productive components of the economy are dependent	Volume II: Social Impact Assessment

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
		on effective access. (Transportation infrastructure).	
	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	The location of the proposed project does not appear to conflict with the land use planning objectives contained in the SDF. In this regard the site does not appear to be located within a Tourism Focus Area or a Protected and Critical Biodiversity Area (Tier 1). In terms of land use, the site is located in an area designated as grazing potential. The area to the north of the site is however identified as a Tourism Focus area. Impacts to the cultural landscape are visual/contextual in nature and, if development goes ahead, would definitely occur. The significance of this impact calculates to medium. Although mitigation measures can be suggested to reduce the overall intensity of the impacts, these will have no real effect on the impact significance which remains medium after mitigation. There are no fatal flaws in terms of the cultural landscape, especially since the area is a REDZ which encourages an accumulation of impacts in one area (admittedly far larger than the area considered for this assessment) and discourages a widespread proliferation of impacts across the wider landscape. The impacts to heritage resources are not significant enough to outweigh the social and economic impacts to be realised by the proposed project.	Volume II: Social Impact Assessment; Heritage Impact Assessment
	Municipal Economic Development Strategy ("LED Strategy").	The BCRLM has identified Local Economic Development (LED) as a key factor in the development of the BCRLM economy and all of its communities. The objectives for the Blue Crane Route LED Strategy that are relevant to the proposed development include: • Promote investor confidence in BCRLM through the provision of sound infrastructure and reliable services; • Promote SMMEs to increase employment opportunities; • Promote the development of the tourism sector. The LED strategy identifies six main pillars aimed at stimulating local economic development in Blue Crane Route Municipality. The following are of relevance to the proposed development: • Alternative sources of energy; • Enterprise Development; • Agricultural Development; • Tourism Development; • Investment in Human Capital.	Volume II: Social Impact Assessment;

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
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?		The impact of creation of employment and opportunities during the construction phase is rated as of medium positive significance. The negative impacts associated with construction (impacts on family structures and social networks, influx of job seekers, risks to safety, livestock and farming operations, risk of fires, impacts from construction vehicles and impacts on farmland) can all be mitigated to levels of low negative significance. Positive impacts of the operation of the proposed facility are rated as high positive (clean renewable energy, creation of a community trust) and medium positive (creation of employment and business opportunities, support for local economic development, income generated for affected farmers) significance with enhancements. Negative impacts associated with the operation of the proposed facility are rated as medium with mitigation (impact on rural sense of place for adjacent game farm operations; impact on adjacent property values and operations; impact on adjacent game farming and hunting tourism) to low (impact on sense of place for others, impact on tourism in the region) The Socio-Economic Development and Enterprise Development commitments of the REIPPPP 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).	Volume II: Social Impact Assessment;
	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 the BCRLM LED strategy and skills development programs through the creation of employment and business opportunities, and the opportunity for skills development and on-site training during both construction and operation phases.	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 Sarah Baartman DM IDP identifies a number of key challenges including water supply, housing and services and maintenance of the road network. The initiatives for identified in the IDP that could benefit from the Community Trust include: <u>Increasing agricultural income:</u> • Facilitating investments in local and regional agro-processing operations; • Investing in research and knowledge sharing to improve the quality and	Volume II: Social Impact Assessment;

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
		resilience of crops and livestock; • Supporting local and regional food systems that keep wealth in rural communities. <u>Investing in Natural Capital:</u> • Promoting and incentivising natural resource restoration and conservation including alien vegetation clearing; • Creating new generation green jobs and local income streams rooted in ***renewable energy***; • Growing the rural tourism economy based on natural capital through agri-, adventure- and eco-tourism initiatives. <u>Broadening economic participation</u> • Promoting BBBEE, SMME and cooperative development; • Linking up with and maximising the opportunities for Extended Public Works Programme (EPWP) and Community Work programme opportunities; • Establishing community-based beneficiation projects; • Facilitating community and worker participation in share ownership; • Promoting social development investments. <u>Developing the skills base</u> • Improving the quality and quantity of school education and early childhood development (ECD) through partnerships; • Creating further education opportunities linked to work opportunities in the region; • Developing skills transfer partnerships between established and emerging farmers and between established and emerging businesses. <u>Improving connectivity and utility infrastructure</u> • Assisting with the development of rural broadband and mobile phone connectivity.	
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?		The Green Jobs Study found that 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. A target requirement for BBBEE of 60% of procurement spend has raised employment opportunities for black South African citizens and local	Volume II: Social Impact Assessment;

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
		communities. Social economic development contributions are concentrated in the immediate vicinity of the IPPs and as such there is a lack of equity across geographical areas with some communities benefitting more than others.	
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,*	During the construction phase of the Highlands Wind Energy Facilities approximately 200-250 employment opportunities will be created, of which 55% will be for low-skilled workers, 30% for semi-skilled and 15% for skilled personnel. Members from the local communities (Pearston, Somerset East, and Cookhouse) are likely to be in a position to qualify for the majority of the low skilled and a proportion of the semi-skilled positions.	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;
	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),	During the construction phase opportunities will be created for local transport companies. The need for transport of people and goods will be increased during construction. 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). A Transport Management Plan will be developed prior to construction.	Volume II: Traffic Impact Assessment
	compliment other uses in the area,	Local communities and their service providers will benefit from the socio-economic development provided by the WEF associated with the proposed project.	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 approximately 20 km beyond the urban edge of the nearest town, Somerset East	Volume II: Social Impact Assessment
	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. The existing Eskom transmission lines have the capacity to support this development.	Volume II: Social Impact Assessment

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
		It is expected that any construction water required will be delivered by tankers. Waste removal will be in accordance with best practice as per the EMPr 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.	
	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.	Volume II: Social Impact Assessment
	discourage "urban sprawl" and contribute to compaction/densification,	Not applicable due to the proposed development being outside urban areas.	Volume II: Social Impact Assessment
	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 existing Eskom transmission bordering the proposed development site grid has capacity for additional energy generation. The proposed development will utilise this existing capacity. The project will contribute to economic and infrastructure development in the Eastern Cape Province, in line with the Eastern Cape Provincial Growth and Development Plan	Volume II: Social Impact Assessment
	encourage environmentally sustainable land development practices and processes,	Construction of the renewable energy Highlands 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.	Volume II: Social Impact Assessment
	take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),	Feasibility of access for wind turbine delivery, the site is easily accessible from the national road; Proximity to the Eskom grid with available evacuation capacity; Viable wind resource; The proposed site is transformed agricultural land and current land use is gazing; Willingness of landowners to host a wind farm on their properties; and Position within a Renewable Energy Development Zone for wind energy.	Section 6.2: Site Selection

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Question		**Answer**	**Reference**
	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.	Volume 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	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.	Volume 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 Sarah Baartman DM IDP. One of the strategies of the IDP is implementing an integrated human settlement plan. Thus the proposed development is predicted to support the creation of a more integrated settlement.	Volume 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)?*	The information contained in some key policy and land use planning documents, such as Integrated Development Plans etc., is based on the 2011 Census. Where relevant, information from the 2016 Community Survey has been added. The strategic importance of promoting wind energy is supported by the national and provincial energy policies. However, this does not mean that site related issues can be ignored or overlooked.	Volume II: Social Impact Assessment
	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.	Volume 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	The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (DEADP, 2007).	Volume II: Social Impact Assessment

"promoting justifiable economic and social development"[6]			
Question		**Answer**	**Reference**
	development?		
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: • Impacts associated with the presence of construction workers on local communities; • Impacts related to the potential influx of job-seekers; • 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; • Noise, dust, waste and safety impacts of construction related activities and vehicles. • Visual impacts and associated impact on sense of place; The SIA details mitigation measures including locals first policy, establishment of a Monitoring fund, code of conduct, HIV/AIDS awareness programme; compensation policy with landowners, waste and fire management procedures part of EMPr,	Volume II: Social Impact Assessment
	Positive impacts. What measures were taken to enhance positive impacts?	Creation of employment and business opportunities, and the opportunity for skills development and on-site training: • Locals first policy, use local BBBEE contractors, establish a local skills database; • Inform local authorities and community representatives of final decision and potential job 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; • Establish a visitor centre. As indicated in the literature review, visitor centers in Scotland have attracted large numbers of visitors to wind farms. • Establish database of local service providers, specifically BBEEE companies, and notify of tender process and assist local BBBEEE companies to complete and submit required tender forms • SBDM and BCRLM in conjunction with local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.	Volume II: Social Impact Assessment

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Question		**Answer**	**Reference**
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.)?		Some impacts are expected on ecological processes, vegetation and fauna. These impacts are considered to be of low significance and manageable.	Volume II: Social Impact Assessment; Fauna & Flora Specialist Basic Assessment
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?		A suitable site within a REDZ was selected.	Volume II: Social Impact Assessment; Section 6.2: Site Selection
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. It falls within a REDZ	Volume II: Social Impact Assessment
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 BBBEE scorecard on which wind projects are evaluated.	Volume II: Social Impact Assessment
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.	App B: EMPr

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Question		**Answer**	**Reference**
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 DEA (2017) Public Participation Guidelines.	Volume III; Comments & Response Report
	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 practise guidelines. A Public Meeting will be held to present the findings of the Basic Assessment Report. All notifications have been provided in English and Afrikaans. Further languages are made available upon request.	Section 4; Volume III
	ensure participation by vulnerable and disadvantaged persons,	The PPP is being undertaken according to best practise guidelines; Notification of initiation of the PPP was provided in all required channels, i.e. newspaper adverts, site notices, local posters and written notifications.	Section 4; 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 including Contribution to the SBDM IDP and the implementation of a Community trust will assist the local strategies, including improving education facilities and youth development.	Volume II: Social Impact Assessment
	ensure openness and transparency, and access to information in terms of the process,	Legislative requirements and best practise guidelines are followed throughout the process. The PPP is being undertaken in terms of legislative requirements and best practise guidelines.	Section 4
	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 practise guidelines. A Social Impact Assessment forms part of the BA process. The independent Social Specialist ensures that all needs and values are taken into account.	Section 4; Volume III
	ensure that the vital role of women and youth in environmental management and development were	The Social Impact Assessment and PPP that are conducted according to legislation and guidelines will ensure that women and youth are recognised and involved in the process. REIPPPP requirements place specific responsibilities on IPPs in terms of women and	Volume II: Social Impact Assessment

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Question		**Answer**	**Reference**
	recognised and their full participation therein were be promoted?	youth development.	
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 BCRLM are poverty and inequality in the rural areas 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. To date the only negative impact for I&APs of the proposed development is a potential reduction in revenue for the adjacent local hunting industry (middle and high income community) through a change in sense of place for tourists, which is rated as of medium significance in the local context and of low significance in the regional context. Landowners of the proposed development site itself will benefit from an increase of revenue from low grazing potential land.	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.	
Describe how the development will impact on job creation in terms of, amongst other	*the number of temporary versus permanent jobs that will be created,*	200-250 (full-time equivalent) employment opportunities will be created for 20-24 months during the construction phase. 20 full time employment opportunities will be created for the operational phase of the proposed development (minimum of 20 years).	Volume II: Social Impact Assessment

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Question		**Answer**	**Reference**
aspects:	*whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),*	Members from the local community in the area are likely to be in a position to qualify for the majority of the low skilled and a proportion of the semi-skilled jobs. 55% of construction phase jobs will be for low-skilled workers, and 30% for semi-skilled.	Volume II: Social Impact Assessment
	the distance from where labourers will have to travel,	It is expected that most workers will reside in the nearby towns Pearston, Somerset East and Cookhouse.	Volume II: Social Impact Assessment
	the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and	The majority of employment opportunities associated with the operational phase is likely to benefit HD members of the community. 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 permanent employees who are not locally based may purchase houses in one of the local towns in the area, such as Somerset East or Cookhouse, others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, 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. The potential negative visual impact on the areas sense of place and rural character were identified as key concerns by surrounding hunting and game farm owners, whereas surrounding livestock farmers were less concerned about the visual impacts.	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.).	Potential opportunity costs of the proposed development will be restricted to the 4 or 5 surrounding game farm and hunting operations. All of the operations cater for up-market overseas visitors and the existing "African veld" sense of place represents a key component of their marketing strategy for overseas hunters and visitors. The establishment of a wind farm on their western boundary would impact on the areas sense of place, which in turn, may impact on the ability to attract overseas visitors. This would in turn have a potential impact on their operations. The impact on their operations would in turn impact on other local sectors of the economy in the area that benefit from the game farming sector. As indicated in the SBDM IDP, the game	Volume II: Social Impact Assessment

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Question		**Answer**	**Reference**
		farming sector has become an increasingly important sector in the area. The significance of this impact was rated as of medium negative significance. The creation of 200-250 temporary (20-24 month) jobs and 20 permanent jobs associated with the proposed development proceeding was rated as of high and medium positive significance.	
What measures were taken to ensure:	*that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and*	All applicable planning policies and legislation were considered. The proposed development fits with all planning policies. Organs of State were pre-identified and registered on the I&AP database.	Volume II: Social Impact Assessment
	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
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.	Section 1 Volume II
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?		Specialist input provides realistic mitigation measures. Rehabilitation to be undertaken after decommissioning of the proposed development will significantly reduce any potential legacy effects. Specific mitigation and rehabilitation measures are provided in the EMPr.	Appendix B: EMPr
What measures were taken to ensure that he 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?			
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 included the assessment of the No Development alternative, site alternatives, design layout alternatives and technology alternatives.	Section 6

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Question	**Answer**	**Reference**
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?	<u>Cumulative Impact on Sense of Place:</u> Given that the renewable energy projects mentioned above are not within viewing distance of each other and that they form part of REDZ, the cumulative visual impact is considered to be of **low negative significance** in the local context. While certain stakeholders are opposed to the proposed development, others either support the development and or do not have an objection to the establishment of a WEF on the proposed site. This will also have implications for the perceptions of different people towards to the nature and significance of the cumulative impacts associated with wind farms on sense of place. However, the potential impact of wind energy facilities on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of wind facility applications. The Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications and the potential implications for other land uses, specifically game farming and associated tourist activities. <u>Cumulative impact on local services and accommodation</u> The establishment of the proposed 140 MW Highlands WF and the other renewable energy facilities in the SBDM and BCRLM may place pressure on local services, specifically medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction and operational phases of renewable energy projects proposed in the area, including the proposed WF. The potential impact on local services can be mitigated by employing local community members. The presence of non-local workers during both the construction and operation phase will also place pressure on property prices and rentals. As a result, local residents, such as government officials, municipal workers, school teachers, and the police, may no longer be able to buy or afford to rent accommodation in towns such as Somerset East, Bedford and Cookhouse. The LED Manager for the BCRLM interviewed as part of the Spitskop West WF SIA indicated that rental prices in Somerset East and Cookhouse had been driven up during the construction phase of the Amakhala Emoyeni Wind Farm. This impact is rated as of **low negative significance.** However, the potential impacts should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of renewable energy as an economic driver in the area. These benefits will create opportunities for investment in local towns, such as Somerset East and Cookhouse, including the opportunity to up-grade and expand existing services and the construction of new houses. In this regard the establishment of a renewable	Volume II: Visual Impact Assessment; Social Impact Assessment

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Question	**Answer**	**Reference**
	energy will create an opportunity for economic development in the area. The Community Trusts associated with each project will also generate revenue that can be used by the SBDM and BCRLM in consultation with the Eastern Cape Provincial Government, to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the SBDM and BCRLM. <u>Cumulative impact on local economy</u> In addition to the potential negative impacts, the establishment of the proposed 140 MW WF and other renewable energy facilities in the area has the potential to result in significant positive cumulative socio-economic opportunities for the region, which, in turn, will result in a positive social benefit. There are a large number of renewable energy projects proposed in the study area. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The Community Trusts associated with each project will also create significant socio-economic benefits. The Overview of the IPPP (2017) confirms the benefits associated with renewable energy projects for local and regional economies. The total projected procurement spend for BW1 to BW4, 1S2 and 1S2 during the construction phase was R75 billion, while the operational procurement over 20 years is estimated to be in the region of R72 billion. The reports note that the construction spend of R75 billion has resulted in a substantial stimulus for establishing local manufacturing capacity. Actual local content spend reported for IPPs that have started construction amounts to R38.1 billion against a corresponding project value (as realised to date) of R75.8 billion. This means 50% of the project value has been locally procured, exceeding the 45% commitment from IPPs and the thresholds for BW1 – BW4 (25%-45%). The report also notes that the REIPPPP has prompted several technology and component manufacturers to establish local manufacturing facilities. The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and extend over a period of 20-25 years. This impact is rated as of **high positive significance** with enhancements.	

5.1 Need and Desirability Conclusion

The need for the proposed grid connection development is to transfer electricity from the proposed Highlands South WEF to the national grid. Grid connection is necessary for the Highlands WEF project and as such should be viewed in the context of a renewable energy development. Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. Both national and provincial policies and planning documents support the development of renewable energy facilities. The need and desirability for these types of developments play a role in meeting energy and climate change targets and also provide a socioeconomic boost at the local level in areas that are in need of it.

The proposed development site is currently used for low intensity grazing and has little potential for other types of land use. Grazing could continue on the site during the construction and operation of the development. Therefore the change to a mixed land use of grazing and renewable energy would be an improvement to the area.

As discussed in detail above the proposed development represents the best practicable environmental option.

A requirement of the REIPPPP is that in the development of any WEF and associated infrastructure, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed development and other developments in the area has the potential to result in significant positive socio-economic opportunities for the region.

6 ASSESSMENT OF ALTERNATIVES

Alternatives are different means of meeting the general purpose and need of a proposed development and may include alternative sites, alternative layouts/designs, alternative technologies and/or the No Development alternative.

The EIA Regulations indicate that alternatives that are considered in an assessment process should be reasonable and feasible and that I&APs should be provided with an opportunity to provide inputs into the process of formulating alternatives.

The assessment of alternatives should, as a minimum, include the following:

- 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.

Two grid connection 300 m corridor alternatives (Figure 1.3) were provided to the specialists for their impact assessment.

6.1 The No Development Scenario

The No Development 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 grid connection, the main implication of the No Development scenario is that the Highlands South WEF cannot be constructed. Evacuation of the electricity generated by the Highlands South WEF is necessary for the project to proceed. The result will include the following:

- The land-use remains agricultural with no further benefits derived from the implementation of a complementary land use;
- There is no change in the current landscape or environmental baseline;
- Whilst no WEF development will occur on site, other wind energy projects go ahead as planned for other areas locally;
- No additional electricity will be generated onsite or supplied through means of renewable energy resources. This would have implications for the South African Government in achieving its proposed renewable energy target;
- There is no opportunity for additional employment (albeit temporary) in the local area where job creation is identified as a key priority; and
- The local Economic Development benefits associated with the WEF development's REIPPPP commitments will not be realised.

South Africa faces serious electricity and water shortages due to its heavy dependency on fossil fuels and increase in demand. There is therefore a strong need for additional electricity generation options to be developed and to diversify the sources of energy that feed into the national grid.

The purpose of the proposed grid connection is to allow the Highlands South WEF to generate renewable electricity and export this to the national grid. Many other socio-economic and environmental benefits will result from this such as:

- Reduced air pollution emissions - burning fossil fuels generates CO_2 emissions which contributes to global warming. In addition burning fossil fuels produces emissions of sulphurous and nitrous oxides 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 almost no water during operation. As a water stressed country South Africa should be conserving such resources wherever possible;
- Improved energy security – renewables can often be deployed in a decentralised way close to consumers improving grid strength while reduce expensive transmission and distribution losses. They also contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solution – The uptake of renewable energy technology addresses the country's energy needs in a sustainable manner, generating 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 'No Development' alternative will not assist the government in addressing climate change, nor will it assist in supplying the increasing electricity demand within the country, and the renewable energy targets set by the government.

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. As such, the 'No Development' alternative is not a preferred alternative.

6.2 Electrical Grid Connection Alternatives

Two transmission line alternative corridors of 300 m, 150 m either side of the centreline, of either a 132 kV or 66 kV overhead powerline, were assessed. A description of each of these two alternatives is provided below and illustrated in Figure 1.3.

Alternative 1 (Preferred)

The Preferred Alternative is the shortest, most centrally located, and most direct of the two alternatives. This alternative traverses less drainage lines.

Alternative 2

Alternative 2 is slightly longer than the Preferred Alternative and crosses more sensitive drainage features.

6.2.1 Grid Connection Layout Assessment

The two grid connection alternatives have been assessed by each of the specialists. The table below provides a comparative assessment of each of the alternatives by the specialists.

Table 6:1 Grid Connection Alternatives Specialist Assessment

Specialists	Alternative 2	Alternative 1 (Preferred)
Aquatic	No impacts on the aquatic environment will occur based on the proposed alignments and the alternatives. This is based on the assumption that during the final design process all transmission line towers will be located outside of the delineated water courses and the 32m buffer. This alternative is acceptable.	No impacts on the aquatic environment will occur based on the proposed alignments and the alternatives. This is based on the assumption that during the final design process all transmission line towers will be located outside of the delineated water courses and the 32m buffer. This alternative is acceptable.
Terrestrial Flora and Fauna	This power line alternative is similar to the other alternative in terms of sensitivity but is longer and traverses more drainage lines with the result that it	Although the sensitivity of the majority of the route is similar to the other option, the route is shorter and traverses less drainage features with the result that it is the preferred alternative.

Specialists	Alternative 2	Alternative 1 (Preferred)
	is less preferred.	
Avifauna	The potential impacts of Alternative 1 and the Alternative 2 were found to be the same. Either alternative is acceptable with mitigation.	The potential impacts of Alternative 1 and the Alternative 2 were found to be the same. Either alternative is acceptable with mitigation.
Bats	This alternative is preferred from the perspective of Bats due to greater distance from roosts and less woody vegetation along the route.	Alternative 1 is not preferred from the perspective of Bats due to roost proximity and woody vegetation along the route. However electrical infrastructure has low Significance potential impacts on Bats. Thus both route options are acceptable.
Noise	No issues with this alternative from a noise perspective.	No issues with this alternative from a noise perspective.
Visual	Except for a short section of the R63 Route, all the viewpoints are more than 2 km from the proposed powerlines and therefore the visibility would be marginal.	Except for a short section of the R63 Route, all the viewpoints are more than 2 km from the proposed powerlines and therefore the visibility would be marginal.
Heritage and Palaeontology	No significant heritage resources have been identified within any of the corridors and both grid connection options would therefore have the same potential impacts. No preference on palaeontological grounds for one or other route alignment.	No significant heritage resources have been identified within any of the corridors and both grid connection options would therefore have the same potential impacts. No preference on palaeontological grounds for one or other route alignment.
Social	Both Alternatives are acceptable to the land owner.	Both Alternatives are acceptable to the land owner.

6.2.2 Grid Connection Technology Alternatives

The main purpose of the overhead powerline is to connect the proposed Highlands South WEF to the national grid. Technologies change on a regular basis and the most environmentally friendly, reliable, cost effective and safest technology that is available and meets industry standards will be used. Alternatives are proposed for the type of structures which will support the overhead lines. These may include:

- Concrete, steel or wood monopoles (preferred);
- Guy line supported steel structures (small footprint);
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

Refer to **Plates 6-1 to 6-4** for typical examples of these tower types. All aspects of the grid connection, including powerline and supporting structures would need to adhere to industry standards.

Plate 6-1: Concrete, steel or wood monopoles.

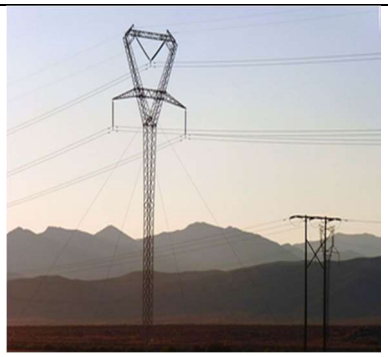


Plate 6-2: Guy line supported steel structures.

Plate 6-3: Free standing metal lattice towers.

Plate 6-4: Multi-pole structures such as H-towers or K-towers.

Alternative Structure 1 (Preferred Alternative)

The preferred supporting structure would be a concrete or steel monopole as these are the Eskom standard and are cost effective. This preferred structure would be subject to line design and engagement with Eskom.

Alternative Structures 2 to 4

Free standing metal lattice towers or guy-line supported steel structures would be beyond the need of the conductor in this case. In addition, these structures are expensive.

The visual and heritage specialists have recommended that lattice structures are also acceptable for use as they are visually more permeable and almost invisible at a distance. Should the proposed power line be parallel with any existing power lines then the same pylons should be used.

6.3 The Preferred Alternative (Alternative 1)

The preferred alternative is the Highlands Alternative 1 Grid Connection, the more direct of the two servitude routes that run from Highlands South WEF on-site substation to the existing on-site Eskom transmission line (Figure 1.3). This alternative is only possible if Highlands South WEF is successful in the REIPPPP and is constructed. The electricity generated by the WEF would then be exported from the on-site substation to the existing transmission lines along an overhead powerline of approximately 20 km in length and into the national grid. This Preferred Alternative will minimise the environmental impacts on sensitive drainage features due to having fewer drainage line crossings than Alternative 2. This alternative is not preferred by Bats due to roost proximity and woody

vegetation along the route. However electrical infrastructure has low Significance potential impacts on Bats and as such either route option is acceptable.

6.4 Highlands South Grid Connection Route Alternative 2

The Highlands Alternative 2 Grid Connection is approximately 500 m longer than the preferred alternative (Figure 1.3). Environmental impacts associated with the proposed grid connection are proportional to its length. The Highlands Alternative 2 Grid Connection is slightly longer than the preferred Alternative 1 Grid Connection, therefore any negative environmental impacts will be greater than for this alternative than for the preferred alternative. This route Alternative 2 will require a greater number of sensitive drainage line crossings than the preferred alternative.

6.5 Alternative Assessment Summary

Based on the assessment of alternatives, it was decided that the proposed Highlands Alternative 1 Grid Connection is considered as the preferred alternative. The two alternatives were compared by each specialist and based on the environmental constraints identified by the specialists the preferred alternative was identified. This preferred alternative will form part of the Final Mitigated Layout to be submitted to the DEA (Figure 1.3), and if approved and awarded preferred bidder status, this layout will further be developed through micro siting of pylons with the assistance from the relevant specialists.

7 THE PREFERRED ALTERNATIVE

7.1 Project Description of the Proposed Grid Connection

The proposed grid connection is one of six components of the proposed Highlands WEF development which comprises the following:

1. Highlands North WEF;
2. Electrical Grid Connection and Associated Infrastructure for the Highlands North WEF (the 'proposed grid connection');
3. Highlands Central WEF;
4. Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
5. Highlands South WEF; and
6. **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF**.

This report and application pertains to the **Highlands South WEF Grid Connection.**

The proposed grid connection will fall wholly within the Highlands WEF site boundary and within the proposed grid corridors, each of 300 m in width (Figure 1.2).

The proposed grid connection will consist of either 66 kV or 132 kV power lines that will run from the on-site substation to the existing on-site Eskom transmission lines and the national grid.

7.1.1 Construction Phase

7.1.1.1 Establishment of a Servitude

A servitude is by definition "the right to use someone else's land for a specified purpose", in this case the right to erect, operate and maintain a power line, as well as access rights to carry out these activities. Ownership of the land remains with the original landowner who signs a servitude agreement and keeps overall responsibility for the land.

A topographical survey will be conducted along the preferred alternative to inform the final route, location and design of the tower foundations, pylons and structures. Once the final servitude route has been confirmed construction of the power line begins. The servitude is generally cleared of wooded plant species and any protruding alien vegetation to reduce fire risk and prevent shortages with vegetation, in line with the Environmental Management Programme (EMPr) and Eskom requirements and guidelines.

Although existing roads and tracks will be used as much as possible, access roads for minor vehicles may be created for the construction phase as well as for periodic maintenance, in negotiation with the relevant landowner.

7.1.1.2 Construction of Power Line Tower Structures

The type of structures which will support the overhead lines is yet to be determined and may include:

- Concrete, steel or wood monopoles;
- Guy line supported steel structures;
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

The preferred type of tower is dependent on a variety of factors, including the terrain, cost, conductor size, live line compatibility and required electrical characteristics. Tower type selection will therefore be based on additional on-site investigations during the detailed design phase of the project. Similarly, the foundation size and type will depend on the type of tower selected as well as conditions of the local terrain. Tower steel is typically delivered on a 24-ton truck, or on smaller vehicles in difficult terrain. The tower structures are assembled on the ground and erected on the constructed foundations using an 8-ton crane truck. Following this the power lines and conductors are strung from tower to tower. The average span between two 132 kV towers is 200 m but can vary between 150 and 375 m depending on the terrain and ground profile.

7.1.1.3 Stringing High Voltage Cables

Power lines to be strung are delivered to the site on cable drums that are placed along the servitude at regular intervals. If the area is inaccessible these may be delivered by helicopter. A pilot cable is then lain down by a pilot tractor driven along the route of the power line. This is used to string the conductors between towers in sections from bend to bend by the means of a pulley system. The correct tension required to reduce sagging and comply with minimum clearance distances is then obtained before clamping the conductors and cutting off any excess cabling.

7.1.1.4 Rehabilitation of Disturbed Areas and Protection of Erosion Sensitive Areas

Following the construction of the grid connection all areas outside of the servitude and other areas required for maintenance will be rehabilitated in accordance with the EMPr.

7.1.2 Operational Phase

The life span of the power line is approximately 25 years, during which time ongoing maintenance is required. Eskom will be responsible for the operational phase and decommissioning phase and will undertake maintenance in accordance with the EMPr and Eskom Standard for Bush Clearance and Maintenance within Overhead Powerline Servitudes (Eskom 2003) and the Transmission Vegetation Management Guideline (Eskom 2009). The guideline promotes minimising the removal of vegetation other than alien vegetation unless it poses a fire hazard.

7.1.3 Decommissioning Phase

Eskom will be responsible for the decommissioning phase. This will include unstringing the power line cables, disassembling the towers, removing the foundations and rehabilitating the servitude according to the EMP.

7.2 Site Description and Location of the Proposed Grid Connection

The Proposed Highlands South Grid Connection would be located approximately 20 km west of the town of Somerset East, bordering the south of the R63 route, approximately 23 km south-east of Pearston, in the Eastern Cape Province. The Proposed Development site is located in the Blue Crane Route Local Municipality (BCRLM) in the Sarah Baartman District Municipality (SBDM), previously known as the Cacadu District Municipality. The main settlements in the municipality are Somerset East, which serves as the administrative and commercial centre, Cookhouse and Pearson. The most significant roads passing through the area are the N10, R61, R63, and the R390. The administrative seat of the SBDM is currently located in the Nelson Mandela Bay Metro area, with disaster centres located throughout the district.

The Proposed Development site lies at the eastern end of the Camdeboo Region and at the foot of the Bruitjieshoogte Mountain. Its land parcels cover an area of approximately 11 180 hectares. The area of interest for development within these land parcels is approximately 9000 hectares (The Proposed Development Area), but the development footprint of all six components will only occupy approximately 2% of this area. The Proposed Project is situated entirely within the Cookhouse REDZ (Figure 1.1).

The site is located in broken terrain associated with the transition to the Great Escarpment north of the site (of which Groot Bruintjieshoogte is a southern outlier). A minor, north-south aligned escarpment is located south of Bruintjieshoogte, effectively running across the western-most portion of the site and further south. The bulk of the site consists of hilly to undulating terrain. East of the site the terrain gradually levels out into a relatively flat, large plain. The drainage in the area drains into the Voël River and Little Fish Rivers located 10-15 km west and east (of the site) respectively. Few natural surface water features are located on the site and immediate surrounds.

The coordinates of the proposed grid site corridor are given in Figure 1.3. The proposed grid connection passes through of two farm parcels, the Remainder of the Farm Rietfontein 102 and Portion 2 of Farm Doornrivier 105.

The electricity generated by the proposed Highlands South WEF will be transferred from the turbines via cabling to the on-site substation. The substation will house electrical infrastructure such as transformers and switch gear to enable the energy to be transferred via the proposed grid connection into the Eskom national grid.

An Eskom corridor (66 kV and 132 kV line) runs parallel to the R63 approximately 3 km north of the proposed substation site and traverses the northernmost portion of the site approximately 200 m south of the R63. The proposed development intends to connect to this grid infrastructure on site.

The route for the 66 kV or 132 kV lines will include a servitude corridor of 31 m in width.

Municipal services for the proposed grid connection will not be required. Water required for construction will be brought in with tanker trucks, and waste will be removed to the nearest registered landfill. The EMPr will include measures for the reduction, reuse and the recycling of wastes during the construction phase. Portable toilets will be used during construction of the grid connection.

7.2.1 Farm Rietfontein

Farm 102 Rietfontein is owned by Mr Zirk Jordaan. The inhabited portion of the farm (**Error! Reference source not found.**) lies north of the R63 and is excluded from the Proposed Development Area. There are no farmsteads on the farm that form part of the proposed development.

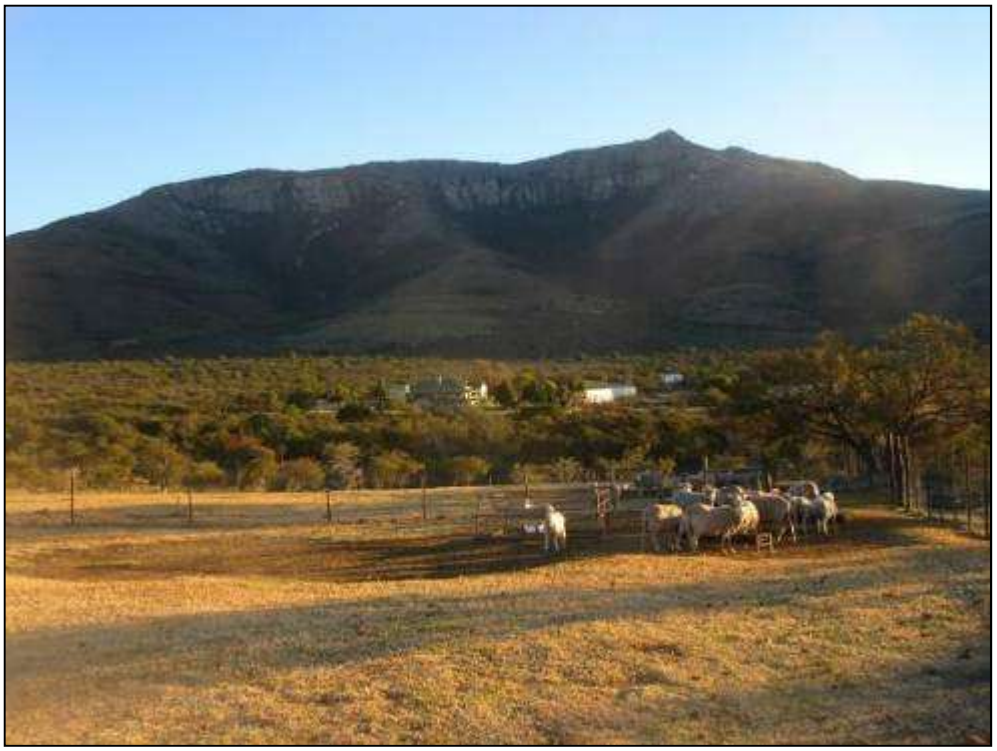


Figure 7.1: Sheep and farmstead on portion of Rietfontein located north of the R63

Rietfontein currently employs 10 tenured households and is used for extensive livestock farming of beef cattle, sheep and angora goats. Labour is based elsewhere and transported in by the owner when required for farming operations. No commercial hunting or tourism activities are taking place on the property. A substation is proposed on Rietfontein in an area not considered to be of agriculture value to the owner. Rietfontein is accessed directly off the R63.

7.2.2 Farm Doorn Rivier and Nels Kraal

Portion 2 of Farm Doornrivier 105 and The Remaning Extent of Nels Kraal 143 is owned by National Government and rented by the Fani Brothers who farm the land.

Doornrivier currently employs 4 tenured households (Figure 7.2) and is used for livestock farming. The farmsteads located on Doornrivier do not form part of the Highlands site. Labour is based elsewhere and transported in by the owner when required for farming operations. No commercial hunting or tourism activities are taking place on the property.

Figure 7.2: Currently uninhabited farm house on Doornrivier. Four worker households live permanently on the farm.

Doornrivier is accessed via a farm road off the Waterford Road. The road also provides access to farms such as Geluk and Tevrede and terminates at Doornrivier farmstead. Access control is by means of locked gates. This road is proposed as access road for the Central Phase. Apart from Doornrivier the road does not traverse any farm yards (Figure 7.3).

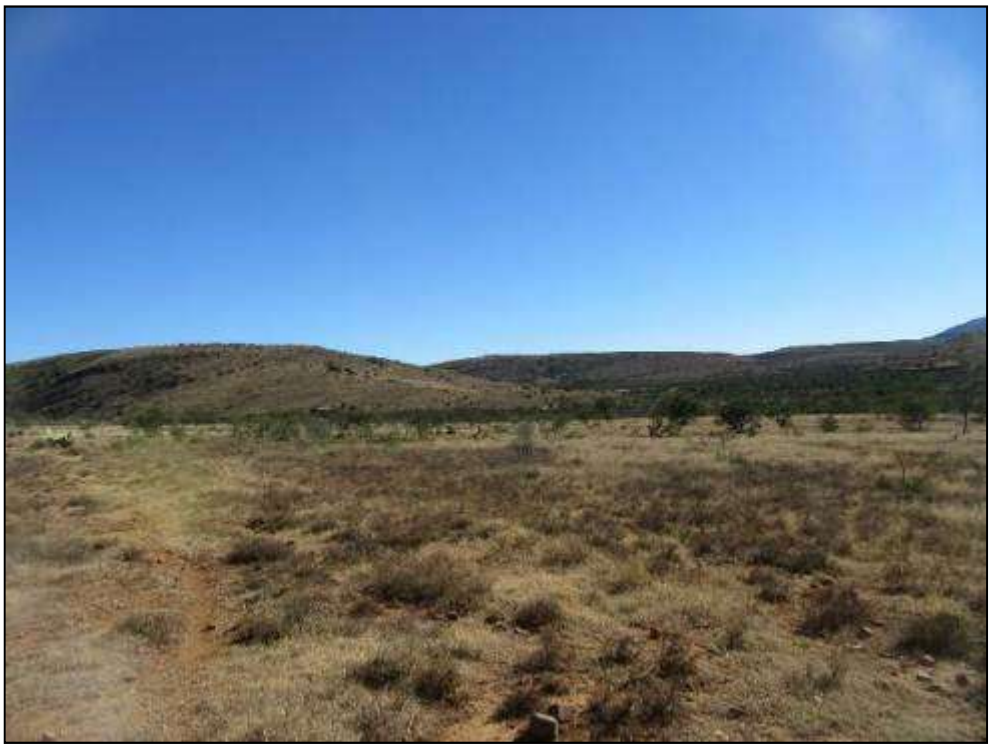
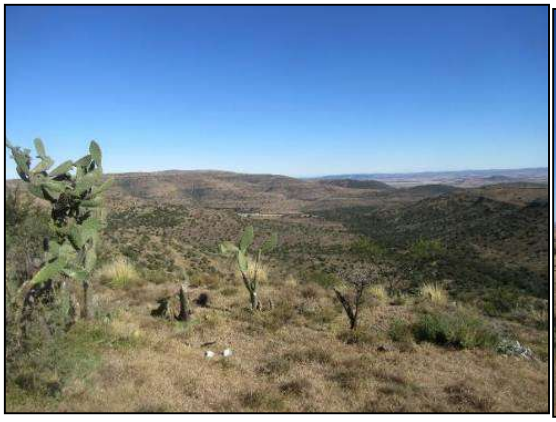
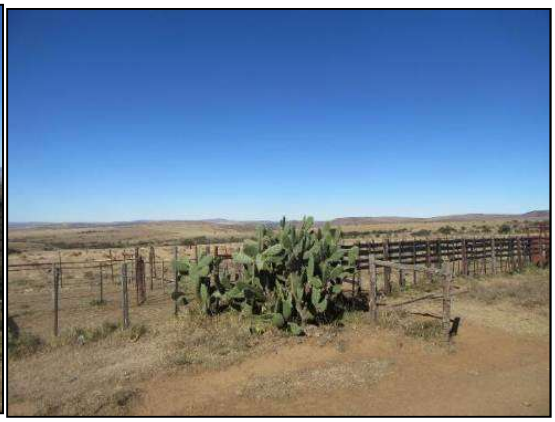


Figure 7.3: View north-west from access road to Doornrivier onto area associated with Central Phase (on hills)

7.2.3 Farm Spaarwater

The farm 103 Spaarwater is owned by GKW Gebou Trust (Mr Renier Kemp) who resides in Graaf Reinet. The western portion of Spaarwater does not form part of the proposed development site as it consists of steep terrain associated with the western escarpment. The farmstead is located on the excluded portion of the site and no staff reside on the property. The farm is used for extensive beef, sheep and goat farming with labour only brought in when required. No commercial hunting or tourism is conducted on the farm.

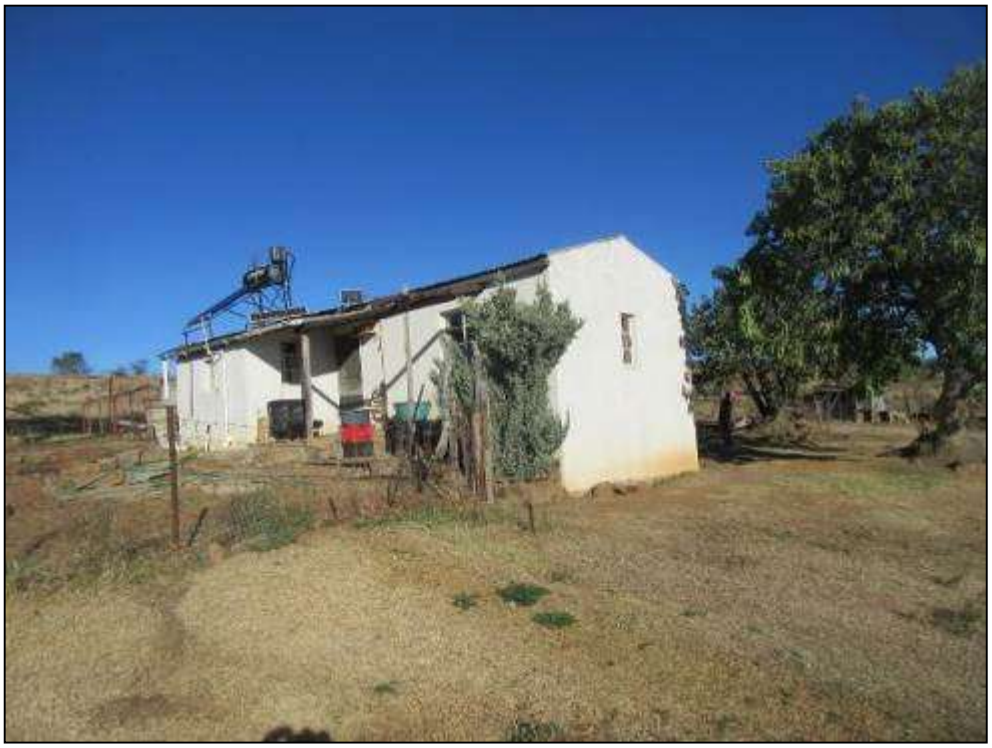
Photograph 7.4 (left) and 7.5 (right): Spaarwater farm yard (middle distance) located to the west of the site viewed from Bruintjieshoogte Pass; Stockpens on Spaarwater

7.2.4 Farm Coetzeesfontein

The farm 104 Coetzeesfontein is owned by the Jakkie Nel Trust (Mr Jakkie Nel). The western and southern section of the farm do not form part of the proposed development area and consist of largely steep terrain associated with the western escarpment. Only skeleton supervisory staff reside on the property.

7.2.5 Farm Highlands

The farm Highlands is owned by Mr Bill Brown and used for extensive livestock grazing. Only one household resides on the farm in a supervisory capacity, with labour being brought in by the farmer when required (Photograph 7.5). Carrying capacity varies across the site from around 9-14 hectares per Large Stock Unit and is a function of grass-veld occurrence and type. The grazing resource is sufficiently productive to allow for year-round grazing. Properties are therefore typically stocked year-round. Cropping activities are very limited and limited to small plantings of fodder for own use near farmsteads.



Photograph 7.6: Labourer's house on Highlands Farm

8 DESCRIPTION OF THE BASELINE ENVIRONMENT

The section below is a summary of the baseline environmental in relation to the proposed Highlands South Grid Connection. Detailed description of the entire Proposed Development area (comprising all six components) can be found in Volume II – Specialist Studies.

The Highlands Wind Farm, within which the proposed grid connection site occurs, consists of a large ridge system which grades gently to the east and more sharply to the west. The western valleys and slopes are dominated by Camdebo Escarpment Thicket and are considered generally sensitive and unsuitable for development. The plateau and eastern slopes and low hills consist of Bedford Dry Grassland and are generally considered less sensitive than the western slopes. The footprint is largely restricted to the lower-lying eastern slopes and gentle hills of the site and are considered generally suitable for development. The abundance of plant species of conservation concern in these areas is low and species of high conservation concern were not observed within the development footprint.

Although there are a variety of mammals of conservation concern known from the broader area including Vaal Rhebok (NT), South African Hedgehog (NT), Black-footed cat (VU), Serval (NT), Brown Hyena (NT) and African Striped Weasel (NT), it is not likely that the affected areas are of high significance for these species and long-term impacts on listed fauna are likely to be low.

Species that may be affected on the proposed development site include Blue Crane, Ludwig's Bustard, Secretarybird, and Southern Black Korhaan. Ludwig's Bustard and Blue Crane are known to be particularly prone to collision.

A few large birds susceptible to electrocution (particularly in the absence of safe and mitigated structures) occur in the area and may occasionally be present on the proposed development site namely: Cape Vulture, Verreaux's' Eagle and Martial Eagle.

Electrocution is also possible on electrical infrastructure within the substation particularly for species such as crows and owls.

The Highlands South Grid Connection is partly within a tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape. Although the development would result in some habitat loss within the CBA, this is not likely to compromise the overall functioning of the CBA as it is very large and the construction of the grid connection will occupy a very small proportion of the CBA.

The proposed development occur within the following catchments within the Great Karoo and Drought Corridor Ecoregions both located within the Mzimvubu-Tsitsikamma Water Management Area:

- Q80D – Klein Vis catchment
- Q80F – Brak River catchment
- N30B – Slotspruit, Klipplaat and Voël Rivers catchments

These catchments are characterised by perennial water courses and drainage lines associated with these mainstem systems listed above, and most flow only after high rainfall events. The Klein Vis (Little Fish) does however form part of the Fish-Sundays River Canal scheme that receives a constant supply of water from the Gariep Dam. According to the National Freshwater Ecosystems Priority Area (NFEPA) wetland data, no natural wetland could occur within the study area.

The initial ~7 km portion of both Alternative 1 and 2 for the South Phase up to the proposed substation location is shared. North of the Central substation, the alignments are identical to those followed by Alternatives 1 and 2 of the Central Phase, i.e. with Alternative 1 marginally shorter (~500 m) than Alternative 2. South of the Central substation, the South Phase Alternatives (single alignment) traverse additional portions of Doornrivier as well as the northernmost portion of Highlands. Neither alternative is located in significant proximity to any farmsteads.

9 ASSESSMENT OF POTENTIAL IMPACTS

9.1 Soil

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or future agricultural production. Although the development may include impacts on the resident farming community, for example visual impacts, such lifestyle impacts do not necessarily impact agricultural production and are therefore not relevant to and within the scope of an agricultural impact assessment. Such impacts are better addressed within the impact assessments of other disciplines.

The assessment of impacts is identical for the two alternatives in the South Grid Connection, as there is nothing materially different that would result in different impacts between any of the two alternatives.

The significance of all potential agricultural impacts is kept low by two important factors.

Electricity grid infrastructure has minimal impact on agriculture after construction because all viable agricultural activities in the project area can continue, undisturbed below power lines.

The proposed site is on land of limited agricultural potential that is only viable for grazing.

Only one agricultural impact has been identified. It is a direct, negative impact that applies to two of the phases of the development (construction and decommissioning). It is assessed in table format below.

Grid Alternative 1 and 2

Impact Phase: Construction and Decommissioning Phase							
Impact description: Soil degradation Soil degradation can result from erosion and topsoil loss. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance and vegetation removal. Loss of topsoil can result from poor topsoil management during construction related soil profile disturbance. Soil degradation will reduce the ability of the soil to support vegetation growth.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?	Soil degradation can be reversed only to some extent and only with substantial inputs over a significant period of time.						
Will impact cause irreplaceable loss or resources?	No, because only a very small amount of grazing land is impacted and such land is not a scarce resource.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • Implement an effective system of storm water run-off control using bunds and ditches, where it is required - that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion. • Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. • If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.							

9.2 Ecology

Impact Phase: Construction							
Impact description: Impact on vegetation and listed plant species							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?	No. Transformation is a necessary outcome of the development and while some areas will become revegetated, some long-term habitat loss is likely.						
Will impact cause irreplaceable loss or resources?	No. No critical or rare habitats are within the development footprint.						
Can impact be avoided, managed or mitigated?	Possibly, through avoidance, but some residual impact is likely.						
Mitigation measures: • Preconstruction walk-through of the approved development footprint to ensure that sensitive habitats and							

species are avoided where possible.

- Ensure that lay-down and other temporary infrastructure is within low- sensitivity areas, preferably previously transformed areas if possible.
- Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development.
- A large proportion of the impact of the power line would stem from access roads and these should be minimized as far as possible and not be larger than required.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- Demarcate sensitive areas in close proximity to the development footprint as no-go areas with construction tape or similar and clearly mark as no-go area.

Residual Impact	The will be some habitat loss that is an unavoidable impact of the development and cannot be effectively mitigated.

Impact Phase: Construction							
Impact description: Faunal impacts due to construction activities							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Construction-phase disturbance will be transient, but some habitat loss would be long term.						
Will impact cause irreplaceable loss or resources?	Not likely as there do not appear to be any significant populations of species of conservation concern within the affected area.						
Can impact be avoided, managed or mitigated?	Only partly as noise and construction phase disturbance and habitat loss cannot be entirely avoided or mitigated.						

Mitigation measures:

- Preconstruction walk-through of the facility to identify areas of faunal sensitivity.
- During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.
- No fires should be allowed on site as there is a risk of uncontrolled fires.
- If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.
- 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 unauthorized persons should be allowed onto the site and site access should be strictly controlled.
- All construction vehicles should adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often needlessly persecuted.

Residual Impact	Noise and disturbance during construction cannot be well mitigated, but would be transient. Some habitat loss for fauna would persist for the operational lifetime of the facility.

Impact Phase: Operation							
Impact description: Soil erosion							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	The loss of large amounts to topsoil would potentially be an irreplaceable loss of resources, but with mitigation, this can be avoided.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, erosion risk can be well mitigated.						
Mitigation measures: • Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water 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, as per the Erosion Management and Rehabilitation Plans for the project. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.							
Residual Impact	With mitigation there would be negligible residual impact.						

Impact Phase: Operation							
Impact description: Alien plant invasion							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	With mitigation there would no loss of resources.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, alien plants can be controlled and reduced to very low impact.						
Mitigation measures: • Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as Prosopis are already present in the area and are likely to increase rapidly if not controlled. • Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as these are also likely to be prone to invasion problems. • 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	With mitigation there would be little to no residual impact.

Impact Phase: Operation							
Impact description: Impact on Critical Biodiversity Areas and Broad-Scale Ecological Processes							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?	The impact would last for the lifetime of the development.						
Will impact cause irreplaceable loss or resources?	Unlikely						
Can impact be avoided, managed or mitigated?	To a large extent, but some residual impact would persist for the lifetime of the infrastructure.						
Mitigation measures: • Minimise the development footprint, especially within the high sensitivity areas. • Specific avoidance and mitigation may be required to reduce the impact on certain habitats of limited extent and high ecological or conservation significance as may be informed by the preconstruction walk-through of the power line route and associated infrastructure.							
Residual Impact	Some of the impact results from the presence of the infrastructure and would therefore persist for as long as it was present.						

Impact Phase: Decommissioning							
Impact description: Faunal impacts due to decommissioning phase activities							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	The impact would be transient and persist for the decommissioning period only						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Most of the impacts can be mitigated and those that cannot would be transient.						
Mitigation measures: • Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities. • 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. • All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises. • No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped. • All above-ground infrastructure should be removed from the site.							
Residual Impact	Decommissioning would in principle return the site to its former state, but in practice, some degradation of the development footprint can be anticipated, which would reduce its long-term value as faunal habitat.						

Impact Phase: Decommissioning							
Impact description: Soil erosion risk							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	The loss of large amounts to topsoil would potentially be an irreplaceable loss of resources, but with mitigation, this can be avoided.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, erosion risk can be well mitigated.						
Mitigation measures: • Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • There should be regular monitoring for erosion for at least 2 years after decommissioning by the applicant to ensure that no erosion problems develop as result of the disturbance, and if they do, to immediately implement erosion control measures. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area.							
Residual Impact	With mitigation, there would be little residual impact.						

Impact Phase: Decommissioning							
Impact description: Alien plant invasion							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	With mitigation there would be no loss of resources.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, alien plants can be controlled and reduced to very low impact.						
Mitigation measures: • Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species. • Due to the disturbance at the site alien plant species are likely to be a long-term problem following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. • Regular monitoring for alien plants within the disturbed areas for at least two years after decommissioning or until alien invasives are no longer a problem at the site. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.							
Residual Impact	With mitigation there would be little to no residual impact.						

9.3 Aquatic

If no towers are located within the waterbodies and watercourses, it is anticipated that the overall impacts with mitigation would be low to none, based on the assumption that existing tracks, cattle pathways and roads are used as construction access routes as far as possible and where new access roads are required they must avoid sensitive aquatic areas. Further all erosion mitigation measures recommended in this report must be effectively implemented for runoff generated by these tracks as well as the substations. This must be confirmed during a post approval walk down or inspection of the final tower positions and access routes by the aquatic specialist.

Grid Alternative 1 and 2

Impact Phase: Construction and Operational Phase							
Impact description: Increase in sedimentation and erosion within the development footprint during the construction phase and to a lesser degree the operational phase							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.							
Residual Impact	During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) already deposited downstream. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.						

Impact Phase: Construction and Operational Phase							
Impact description: Impact on localized surface water quality mainly during the construction phase During construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	Yes						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • Strict use and management of all hazardous materials used on site. • Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery,							

cement during construction, etc.). • Containment of all contaminated water by means of careful run-off management on the development site. • Strict control over the behaviour of construction workers. • Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced. • Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility.	
Residual Impact	Residual impacts will be negligible after appropriate mitigation.

9.4 Avifauna

The key potential impact types on avifauna associated with grid connection infrastructure are:

- Habitat destruction;
- Disturbance and displacement;
- Collision with power lines;
- Electrocution; and
- Disruption of bird movements.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Destruction of habitat used by birds							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	L	M
Can the impact be reversed?	Yes, areas disturbed during construction can be rehabilitated after construction and after decommissioning.						
Will impact cause irreplaceable loss or resources?	No, rehabilitation of habitat is possible.						
Can impact be avoided, managed or mitigated?	Yes, the total area of impact (and thus the intensity rating) can be minimised. The servitude can be rehabilitated after project close.						

Mitigation measures:

- Existing roads and farm tracks should be used where possible;
- The minimum footprint areas of infrastructure should be used wherever possible, including access road widths and lengths;
- A site specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. ECOs to oversee activities and ensure that the site specific construction environmental management plan (CEMP) is implemented and enforced;
- Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final power line routes to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the CEMP;
- Construction of grid infrastructure (within the WEF site) must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- Any clearing of stands of alien trees on site should be approved first by an avifaunal specialist;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the Construction Environmental Management Plan (CEMP); and

- The Grid Connection route should, where possible, follow existing linear infrastructure such as roads and power lines, and should be constructed as close as practically possible to the existing infrastructure.

Impact Phase: Construction Phase							
Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Can the impact be reversed?	Partially, in some areas, birds disturbed during construction may return to their activities after completion of construction.						
Will impact cause irreplaceable loss or resources?	Unlikely, disturbance and potential displacement of birds may impact breeding and thus impact on the population of a species.						
Can impact be avoided, managed or mitigated?	Partially, some disturbance is inevitable with the activities associated with construction.						

Mitigation measures:

- A CEMP must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. ECOs to oversee activities and ensure that the site specific CEMP is implemented and enforced;
- Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final power line route to identify any nests/breeding/roosting activity of sensitive species as well as any additional sensitive habitats. The results of which may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise; and
- Sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be avoided.

Impact Phase: Operational Phase							
Impact description: Bird mortality from power line collision							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Can the impact be reversed?	Possibly, bird fatalities are irreversible. However local populations may recover if the occurrence of deaths is low.						
Will impact cause irreplaceable loss or resources?	Possibly, collisions with overhead power lines causes bird fatalities which could significantly impact populations of certain species.						
Can impact be avoided, managed or mitigated?	Yes, reducing the total distance of overhead power lines and increasing their visibility by fitting bird flight diverters (BFD's) can reduce the number of collisions.						

Mitigation measures:

- Grid infrastructure should not be constructed in No-Go areas;
- Construction of grid infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- Wherever possible, place new overhead power lines adjacent to existing power lines or linear infrastructure (e.g. roads and fence lines). Where the new power line is adjacent to an existing line, ensure that new pylons are staggered so that they are not in line with existing pylons wherever possible;
- Prior to construction, the avifaunal specialist must conduct a site walkthrough to determine the power line

spans that will require marking devices [Bird Flight Diverters (BFDs)] to increase visibility. It is likely that the specialist may recommend all, or the vast majority of spans will need to be mitigated, and suitable financial allowance should be made for this;

- Install bird flight diverters as per the instructions of the specialist following the site walkthrough, which may include the need for modified BFDs fitted with solar powered LED lights on certain spans.
- Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations.
- Any mortalities should be reported to the Endangered Wildlife Trust (EWT).

Impact Phase: Operational Phase							
Impact description: Bird mortality from electrocution							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	M	Negative	L	L	H
Can the impact be reversed?	Possibly, bird fatalities are irreversible. However local populations may recover if the occurrence of deaths is low.						
Will impact cause irreplaceable loss or resources?	Unlikely, electrocution from overhead power lines causes bird fatalities, although this is unlikely to happen and therefore won't significantly impact populations.						
Can impact be avoided, managed or mitigated?	Yes, reducing the total length of overhead power lines and using a safe pylon design can reduce the risk of electrocution.						
Mitigation measures: • Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures (in line with standard Eskom guidelines), with clearances between live components of 1.8 m or greater and which provides a safe bird perch; • All electrical infrastructure, including transformers and substations, must be designed in line with Eskom's standards that ensure adequate insulation of all components to prevent electrocution of birds; and • Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations. Any mortalities should be reported to the EWT.							

Impact Phase: Operational Phase							
Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Can the impact be reversed?	Possibly, after decommissioning and rehabilitation displaced species will possibly return.						
Will impact cause irreplaceable loss or resources?	Unlikely, disturbance and potential displacement of birds may impact breeding and thus impact on the population of a species.						
Can impact be avoided, managed or mitigated?	Partially, some disturbance is inevitable with the operational activities, but these can be minimised.						
Mitigation measures: • A site specific Operational Environmental Management Plan (OEMP) must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to							

reduce unnecessary disturbance. All contractors are to adhere to the OEMP and should apply good environmental practice during all operations;

- No bird nests must be disturbed or removed from any pylon or substation infrastructure prior to consultation with and approval from the avifaunal specialist;
- The Manager and field staff responsible for maintenance and repairs on the grid connection line (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Grid Connection site, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction; and
- Operational phase bird monitoring, in line with applicable guidelines, must be implemented to include monitoring of the Grid Connection route and must include monitoring of all raptor nest sites for breeding success.

Impact Phase: Decommissioning Phase

Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M

Can the impact be reversed?	Possibly, after decommissioning and rehabilitation some displaced species may possibly return.
Will impact cause irreplaceable loss or resources?	Unlikely.
Can impact be avoided, managed or mitigated?	Partially, some disturbance is inevitable with the decommissioning activities, but these can be minimised.

Mitigation measures:

- An EMP must be implemented, which gives appropriate and detailed description of how decommissioning activities must be conducted. All contractors are to adhere to the EMP and should apply good environmental practice during decommissioning;
- ECOs to oversee activities and ensure that the CEMP for decommissioning is implemented and enforced;
- The appointed ECO must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), decommissioning activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed; and
- Prior to decommissioning, an avifaunal specialist should conduct a site walkthrough, covering the entire power line route to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final decommissioning schedule in close proximity to that specific area, including abbreviating activity times, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.

9.5 Bats

Impact Phase: Construction Phase

Impact description: Roost disturbance

The grid connection infrastructure may impact bats directly through the disturbance of roosts during construction. Excessive noise and dust during the construction phase could result in bats abandoning their

roosts, depending on the proximity of construction activities to roosts. This impact will vary depending on the species involved; species that may roost in trees are likely to be impacted more (e.g. Cape serotine and Egyptian free-tailed bats; Monadjem et al. 2010) because tree roosts are less buffered against noise and dust compared to roosts in buildings and rocky crevices. Roosts are limiting factors in the distribution of bats and their availability is a major determinant in whether bats would be present in a particular location. Reducing roosting opportunities for bats is likely to have negative impacts.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Unknown
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- It may be possible to limit roost disturbance and abandonment by avoiding construction activities near roosts. These include trees, caves, rocky crevices and buildings along the grid connection route.
- It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence.
- A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified.

Will this impact contribute to any cumulative impacts?	The cumulative impact of bats abandoning their roosts is dependent on the number of roosts affected, the species involved and extent of the impact across the assessed region. With effective management of the construction process across the cumulative developments and limiting roost disturbance, the cumulative impacts can be reduced to low.

Impact Phase: Construction Phase

Impact description: Roost destruction

The grid connection infrastructure may impact bats directly through the physical destruction of roosts during construction. Roosts are limiting factors in the distribution of bats and their availability is a major determinant in whether bats would be present in a particular location. Reducing roosting opportunities for bats is likely to have negative impacts. Potential roosts that may be impacted by construction activities include trees, rocky crevices and buildings. Roost destruction can impact bats either by removing potential roosting spaces which reduces available roosting sites or, if a roost is destroyed while bats are occupying the roost, this could result in bat mortality. It is likely that roost destruction will occur if construction activities require the removal of trees, buildings and blasting rocky outcrops. If bats are occupying such roosts at the time they are destroyed it is likely this could result in mortality. However, a low numbers of roosts will likely need to be destroyed resulting in the significance of this impact being low after mitigation.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	No
Will impact cause irreplaceable loss or resources?	Yes
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- The grid connection route can be designed and constructed in such a way as to avoid the destruction of

potential roosts, particularly trees, caves, rocky crevices (if blasting is required) and buildings.
- No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation.
- It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence.
- A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified (limited to rocky crevices and buildings).
- A site-specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction.
- During construction, laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off-road driving.
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the Construction Environmental Management Plan (CEMP).

Will this impact contribute to any cumulative impacts?	The cumulative impact of destroying multiple roosts across a region will be negative. With mitigation, effective design of WEFs and preventing roost destruction, the cumulative impacts can be reduced to low.

Impact Phase: Construction Phase

Impact description: Habitat modification

Bats can be impacted indirectly through the modification or removal of habitats (Kunz et al. 2007b). The removal of vegetation during the construction phase will impact bats by removing cover and linear features that some bats use for foraging and commuting (Verboom and Huitema 1997). The footprint of the grid connection route is small relative to the remaining habitat available in the surrounding area and as such the removal of vegetation is not likely to result in a significant impact. This impact can be reduced even further by limiting the removal of vegetation as far as possible.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	Yes
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:
- This impact must be reduced by limiting the removal of vegetation as far as possible. A site-specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction.
- A bat specialist should conduct a site walkthrough, covering the final power line routes and the switching station and substation areas, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats.
- During construction laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off-road driving.
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the Construction Environmental Management Plan (CEMP).

Will this impact contribute to	Cumulative impacts should be low because of the limited amount of vegetation that would be removed relative to the large area in the region

any cumulative impacts?	that would not be developed. However, this will depend on the types of vegetation that are removed because the cumulative impact of removing endangered habitat will be greater than removing habitat that is not threatened.

Impact Phase: Operational Phase

Impact description: Bat mortality through collision with transmission lines

Insectivorous bats are unlikely to collide with transmission lines due to their ability to echolocate. They are therefore able to detect and avoid obstacles in their path, such as electrical cabling. Fruit bats do not echolocate in the same manner and can collide and become electrocuted by transmission lines. There is no published evidence of this in South Africa but these events do occur globally.

The geographic distribution of at least two species of fruit bat, the Egyptian rousette and Wahlberg's epauletted fruit bat, may overlap with the proposed grid connection route. The existence of suitable caves for roosting and fruit trees along or across this route may increase the likelihood that this species is present however these features are not present along the proposed grid connection routes.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	L	M
With Mitigation	L	M	L	Negative	L	L	M

Can the impact be reversed?	No
Will impact cause irreplaceable loss or resources?	Yes
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- As this impact is unlikely to occur, no mitigation options are provided.

Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.

9.6 Noise

No potential noise-sensitive developments have been identified within the 300 m wide corridor of the potential South Grid Connection routes.

Any noise associated with the transmission lines is therefore considered to be of negligible impact.

9.7 Heritage

It is very likely that some archaeological materials will be directly impacted but, given the very small footprints of power line pylons, highly unlikely that resources of high cultural significance would be affected. Because of the expected generally low cultural significance the intensity of expected impacts is rated as being low. The nature of the archaeology seen on site suggests that the extent of any impacts would never extend much beyond the site level so this was rated as low. Impacts to archaeological resources are permanent which leads to a duration of high. Although no significant archaeological sites are located within the project footprint areas, it is probable that some resources will be found when the actual alignments are surveyed but the probability of them being impacted is rated as low because of the small disturbance footprints involved. The calculated Significance is low.

With mitigation impacts would still definitely occur. However, the probability of impacts to culturally significant sites remains low. The impact Significance also remains low.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Impacts on archaeological resources Archaeological resources may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No, once archaeological artefacts are disturbed/destroyed the site cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, heritage resources are regarded as unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then archaeological mitigation can be easily effected (there are no identified no-go areas within the present footprint).						
Mitigation measures: • Commission an archaeological walk-through survey to identify sites within final footprint • Carry out any archaeological mitigation for sites of cultural significance that cannot be avoided							

Impact Phase: Construction Phase							
Impact description: Impacts on graves Graves may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Grid Alternative 1							
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	L	L	H
Grid Alternative 2							
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	M	L	H
Can the impact be reversed?	No, once graves are disturbed/destroyed they cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, every grave is unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then exhumation can be effected (avoidance is strongly preferred).						
Mitigation measures: • Commission an archaeological walk-through survey to identify graves within final footprint • Carry out exhumation of graves that cannot be avoided							

Impact Phase: Construction / Operational and Decommissioning Phase
Impact description: Impacts to the cultural landscape

The cultural landscape would be altered through the addition of a new 'layer' comprising of large wind turbines and related infrastructure.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	M	H	H
Can the impact be reversed?	Yes, if the facility is decommissioned and the land rehabilitated then the impacts would cease.						
Will impact cause irreplaceable loss or resources?	No, because there are many other areas with very similar cultural landscape character.						
Can impact be avoided, managed or mitigated?	No, it is not possible to avoid the impacts. However, mitigation measures can very slightly reduce the severity of impacts.						
Mitigation measures: • Minimise cut and fill operations • Minimise unnecessary surface disturbance • Ensure effective rehabilitation of the development area after construction and again after decommissioning • Further measures would be as described by the visual assessment practitioner.							

9.8 Palaeontology

For the South WEF Grid Connection application two alternative route alignments are being assessed. Given (1) the small scale of excavations for the powerline pylon footings, (2) the shortness of the lines, as well as (3) the low density of sensitive fossil sites recorded within the various grid connection corridors under consideration, the intensity of anticipated palaeontological impacts is rated as low even without mitigation.

For the South Grid Connection there is no preference on palaeontological grounds for one or other route alignment.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Palaeontological heritage resources Destruction, disturbance or damage of fossils preserved at or below the surface of the ground due to surface clearance and excavations during the construction phase (*e.g.* for pylon footings, access roads).							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	L	L	M
With Mitigation	L	H	L	Negative	L	L	M
Can the impact be reversed?	No, lost fossils cannot be re-created while disturbance leads to permanent loss of contextual scientific data.						
Will impact cause irreplaceable loss or resources?	Possible, but unlikely. Most fossils are of widespread occurrence within the outcrop area of a given rock unit outside the project area. However, loss of unique, rare or exceptionally-preserved specimens cannot be discounted.						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • Monitoring of all substantial excavations (e.g. wind turbine foundations) by ECO for fossil material on an on-going basis during construction phase. • Application of Chance Fossil Finds Procedure (See Appendix 2 of the Specialist Report in Volume II): safeguarding new fossil finds and reporting to ECPHRA by ECO for possible recording and sampling /							

collection by professional palaeontologist.

9.9 Visual

The South Grid Connection terminates near the R63 Route. The alternatives impacts are similar in nature and are therefore included in the same tables for the construction, operation and decommissioning phases.

Impact Phase: Construction Phase

Impact description: Potential visual effect of construction activities, including cranes, construction traffic, dust and noise affecting the rural sense of place.

- The construction activities would be highly visible (within 500m) for a short section of the R63.
- The construction activities would be at the site scale.
- The construction activities would be of short term duration.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Yes, through site rehabilitation.
Will impact cause irreplaceable loss or resources?	No, areas disturbed by construction activities can be rehabilitated.
Can impact be avoided, managed or mitigated?	Yes, some visual mitigation is possible through careful siting and screening of the construction camps and stockpiles, and rehabilitation of disturbed areas.

Mitigation measures:

- Location of the powerline off ridgelines and crests where possible to minimize skyline effects.
- Location of the construction camp, batching plant and related storage/stockpile areas in unobtrusive positions in the landscape, away from arterial or district roads, or alternatively screening measures utilized.
- Clear demarcation of construction camps, limited in size to only that which is essential.
- Employment of dust suppression and litter control measures. Formulation and adherence to an Environmental Management Programme (EMPr), monitored by an Environmental Control Officer (ECO).
- Existing roads used where possible for access / maintenance roads.
- Areas disturbed during construction to be rehabilitated to original state.

Impact Phase: Operational Phase

Impact description: Potential visual intrusion of powerline pylons on the rural landscape.

- The powerlines would be highly visible (within 500m) for a short section of the R63.
- The powerlines would be at the site scale.
- The visual intrusion of the powerlines would be of long term duration.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H

Can the impact be reversed?	Yes, but only over the long term through decommissioning.
Will impact cause irreplaceable loss or resources?	No, scenic resources would be restored after decommissioning in the long term.
Can impact be avoided, managed or mitigated?	No, there is little or no potential for mitigation, except for micro-siting of pylons.

Mitigation measures:

- Ridgelines and crests to be avoided in micro-siting of pylons.
- Monopoles to be used in preference to Lattice pylons where possible.

Impact Phase: Decommissioning Phase							
Impact description: Potential visual intrusion of pylons and access roads on the rural landscape.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Neutral	L	L	M
Can the impact be reversed?	Yes, through removal of pylons and rehabilitation of the site.						
Will impact cause irreplaceable loss or resources?	No, the landscape/scenic resources could be restored after rehabilitation in the long term.						
Can impact be avoided, managed or mitigated?	Yes, through removal of pylons and rehabilitation of the site.						
Mitigation measures: • Pylons to be dismantled and removed from the site on decommissioning. • Access roads that are no longer required to be ripped and regraded. • Exposed or disturbed areas revegetated to grazing pasture or natural vegetation to blend with surroundings.							

9.10 Social

The South WEF Grid Connection was assessed as part of the WEF, therefore the impacts shown below are combined for the WEF and the Grid Connection. The assumption here is that the individual impacts for the Grid Connection is expected to be lower than when combined with the WEF.

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- 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;
- Noise, dust, waste and safety impacts of construction related activities and vehicles.

Impact Phase: Construction Phase							
Impact description: Creation of employment and business opportunities during the construction phase							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Positive	M	M	H
With Mitigation	H	L	H	Positive	M	H	H

Can the impact be reversed?	Yes, By not implementing the project
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

Employment

- Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area;
- 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 BCRLM and BCRLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase;
- The local authorities, relevant community representatives and local farmers 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 a training and skills development programmes for local workers 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 SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

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.

Impact Phase: Construction Phase

Impact description: Potential impacts on family structures and social networks associated with the presence of construction workers

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H

Can the impact be reversed?	Yes, By not implementing the project
Will impact cause irreplaceable loss or resources?	Unlikely at a community level
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- 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 should consider the need for establishing a Monitoring Forum (MF) in order to monitor the

construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the SBDM and BCRLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers;
- The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;
- The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site;
- Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Impact Phase: Construction Phase							
Impact description: Potential impacts on family structures, social networks and community services associated with the influx of job seekers							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	L	Negative	L	L	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?	Yes, By not implementing the project						
Will impact cause irreplaceable loss or resources?	Unlikely at a community level						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.							

Impact Phase: Construction Phase							
Impact description: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the movement of construction workers on and to the site							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, repairing damage and compensating for stock losses etc.						
Will impact cause irreplaceable loss or resources?	Unlikely at a community level						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WF will be compensated for. The agreement should be signed before the construction phase commences;							

- Contractors appointed by the proponent should provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;
- The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site;
- The proponent should hold contractors liable for compensating farmers 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 (see below);
- The Environmental Management Programme (EMP) should 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 on 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 trespassing, 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;
- The housing of construction workers on the site should be limited to security personnel.

Impact Phase: Construction Phase

Impact description: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H

Can the impact be reversed?	Yes, repairing damage and compensating for losses etc.
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- The proponent should enter into an agreement with the local farmers in the area whereby losses associated with fires that can be proven to be associated with the construction activities for the WF 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;
- No smoking should be permitted on site, except in 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 summer months;
- Contractor to provide adequate firefighting equipment on-site;
- Contractor to provide fire-fighting training to selected construction staff;
- No construction staff, with the exception of security staff, to be accommodated on site over night;
- As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.

Impact Phase: Construction Phase

Impact description: Potential dust and safety impacts and damage to road surfaces associated with movement of construction related traffic to and from the site

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by rehabilitating disturbed areas.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- As far as possible, the transport of components to the site along the N10 should be planned to avoid weekends and holiday periods;
- The contractor should inform local farmers and representatives from the SBDM and BCRLM Tourism of dates and times when abnormal loads will be undertaken;
- The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor;
- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis[7], adhering to speed limits 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;
- The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined;
- The Contractor should be required to collect waste along access roads on a weekly basis;
- Waste generated during the construction phase should be transported to the local permitted landfill site.
- EMP measures (and penalties) should be implemented to ensure farm gates are closed at all times;
- EMP measures (and penalties) should be implemented to ensure speed limits are adhered to at all times.

Impact Phase: Construction Phase

Impact description: 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 WEFs and power lines will damage farmlands and result in a loss of farmlands for grazing.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by rehabilitating disturbed areas.						
Will impact cause irreplaceable loss or resources?	No, however, disturbed areas will need to be rehabilitated						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the soil and vegetation study. In this regard areas of high potential agricultural and sensitive vegetation soils should be avoided;
- The developer should consult with affected property owners in order to enable them to factor construction activities into their farming schedules;
- The location of wind turbines, access roads, laydown areas etc. should be discussed with the locally affected landowner in the finalisation process and inputs provided should be implemented in the layout as best as possible;

[7] Treated effluent (non-potable) water should be used for wetting of roads and construction areas

- The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer;
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed;
- The implementation of the Rehabilitation Programme should be monitored by the ECO;
- All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas;
- EMP measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld;
- Disturbance footprints should be reduced to the minimum.
- Compensation should be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area.

Impact Phase: Construction Phase

Impact description: 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 WEFs and power lines will damage farmlands and result in a loss of farmlands for grazing.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H

Can the impact be reversed?	Yes, by rehabilitating disturbed areas.
Will impact cause irreplaceable loss or resources?	No, however, disturbed areas will need to be rehabilitated
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the soil and vegetation study. In this regard areas of high potential agricultural and sensitive vegetation soils should be avoided;
- The developer should consult with affected property owners in order to enable them to factor construction activities into their farming schedules;
- The location of wind turbines, access roads, laydown areas etc. should be discussed with the locally affected landowner in the finalisation process and inputs provided should be implemented in the layout as best as possible;
- The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer;
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed;
- The implementation of the Rehabilitation Programme should be monitored by the ECO;
- All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas;
- EMP measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld;
- Disturbance footprints should be reduced to the minimum.

- Compensation should be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area.

Impact Phase: Operational Phase							
Impact description: Development of infrastructure to generate clean, renewable energy							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Positive	M	M	H
With Mitigation	M	H	M	Positive	H	H	H
Can the impact be reversed?			Yes, by removing infrastructure.				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures: • 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; • Establish a visitor centre. As indicated in the literature review, visitor centers in Scotland have attracted large numbers of visitors to wind farms.							

Impact Phase: Operational Phase							
Impact description: Creation of employment and business opportunities associated with the operational phase							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Positive	M	M	H
With Mitigation	M	M	M	Positive	H	H	H
Can the impact be reversed?			Yes, by removing project.				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures: Employment • Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area; • 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 BCRLM and BCRLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase; • The local authorities, relevant community representatives and local farmers 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 a training and skills development programmes for local workers 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 SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.
- The proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project;
- The proponent, in consultation with the SBDM and BCRLM, should investigate the options for the establishment of a Community Development Trust.

Impact Phase: Operational Phase							
Impact description: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	H	M	Positive	M	L	H
With Mitigation	M	H	H	Positive	H	H	H
Can the impact be reversed?	Yes, by not implementing the project.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The SBDM and BCRLM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the SBDM and BCRLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager; • 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 funds generated for the Community Trust from the WEF.							

Impact Phase: Operational Phase							
Impact description: 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.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Positive	L	L	H
With Mitigation	M	M	M	Positive	M	H	H
Can the impact be reversed?	Yes, by not implementing agreements.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- Implement agreements with affected landowners.

Impact Phase: Operational Phase							
Impact description: Visual impact associated with the proposed WEF and the potential impact on the areas rural sense of place.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M – H	M	M
With Mitigation	M	M	M	Negative	M – H	M	M
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The recommendations contained in the VIA should be implemented; • Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.							

Impact Phase: Operational Phase							
Impact description: Visual impact (based on comments from stakeholders who did not identify major concerns) associated with the proposed WEF and the potential impact on the areas rural sense of place.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Negative	L	M	M
With Mitigation	M	M	L	Negative	L	M	M
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The recommendations contained in the VIA should be implemented; • Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.							

Impact Phase: Operational Phase							
Impact description: Potential impact on property values and current operations linked to the visual impact associated with the proposed WF and the potential impact on the areas rural sense of place.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	M	M	M	Negative	M	M	M
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable	No						

loss or resources?	
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact;
- The option of compensation for impact on property values and current operations should be considered.

Impact Phase: Operational Phase							
Impact description: Potential impact of the WF on local tourism							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Negative	L	L	H
With Mitigation	M	M	L	Negative	L	L	H
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.

Impact Phase: Operational Phase							
Impact description: Potential impact of the WF on adjacent tourism operations associated with game farming and hunting							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	M	M	M	Negative	M	M	M
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.

Impact Phase: Decommissioning Phase							
Impact description: Social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	M	H

With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned.
- All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;
- The proponent should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site.

9.11 Traffic

Impact Phase: Construction Phase

Impact description: Vehicle Conflict on-project site

Where either laying cables underground or installing pylons and overhead lines, there is risk of vehicles crashing into people in the work zone where the WEF construction activities overlap with the GRID construction activities on-site.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	L	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Managed						

Mitigation measures:

- Co-ordinate WEF and GRID build to avoid unnecessary overlapping of construction activities.

Impact Phase: Construction Phase

Impact description: Deterioration of gravel Minor Roads. Additional heavy traffic on Minor roads could degrade the existing road pavement.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						

Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.

Mitigation measures:

Carry out regular maintenance of the road to ensure that its condition is maintained or improved:
- Document condition of gravel roads prior to construction.
- Upgrade gravel roads to suitable condition for proposed construction vehicles.
- Ensure that the minor road is left in a better condition post-construction.

Impact Phase: Construction Phase

Impact description: Additional traffic on gravel Minor Roads will result in more dust that reduces visibility and increases potential for crashes on the Minor Roads.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.

Mitigation measures:

Reduce travel speed on gravel road to reduce dust:
- Post speed restriction signage for construction vehicles on minor roads.

Impact Phase: Construction Phase

Impact description: Additional traffic at the Minor Road M00412 intersection with the R63 increases chances of vehicle crashes.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	M	L	M

Can the impact be reversed?	Yes
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.

Mitigation measures:

Alert motorists to construction traffic at the access:
- Place warning construction vehicle signage on the R63 on each approach to Minor Road M00412.
- Ensure that all construction vehicles are roadworthy
- Ensure that all construction vehicles have appropriate drivers licence.

Impact Phase: Operational Phase

Impact description: Negligible Impacts

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With	n/a	n/a	n/a	Negative	n/a	n/a	n/a

Mitigation							
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			No impacts				
Mitigation measures: • There are no impacts requiring mitigation							

Impact Phase: Decommissioning Phase							
Impact description: Deterioration of gravel Minor Roads. Additional heavy traffic on Minor roads could degrade the existing road pavement.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated.				
Mitigation measures: Carry out regular maintenance of the road to ensure that its condition is maintained or improved: • Document condition of gravel roads prior to construction. • Upgrade gravel roads to suitable condition for proposed construction vehicles. • Ensure that the minor road is left in a better condition post-construction.							

Impact Phase: Decommissioning Phase							
Impact description: Additional traffic on gravel Minor Roads will result in more dust that reduces visibility and increases potential for crashes on the Minor Roads.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated.				
Mitigation measures: Reduce travel speed on gravel road to reduce dust: • Post speed restriction signage for construction vehicles on minor roads.							

10 CUMULATIVE IMPACTS

10.1 Geology, Soils and Agriculture

Because of the even lower (negligible) agricultural impacts of power lines compared to wind farms, the agricultural environment can accommodate far more electricity grid infrastructure than currently exists, or is currently proposed, before acceptable levels of change are exceeded. Acceptable levels of change in terms of other types of impact, for example visual impact, would be exceeded long before the levels for agricultural impact became an issue. For the above reasons, the cumulative agricultural impact of the electrical grid connection components can confidently be assessed as negligible and a more formal assessment is irrelevant.

Impact Phase: Cumulative Phase							
Impact description: Regional loss of agricultural land use Agricultural grazing land directly occupied by the development infrastructure, which includes roads and hardstands, will become unavailable for agricultural use. However, only a very small proportion of the total land surface is impacted in this way.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	L	L	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?	Yes, once the wind farm is decommissioned, the footprint of the infrastructure can again be utilised as grazing land.						
Will impact cause irreplaceable loss or resources?	No, because only a very small amount of grazing land is lost and such land is not a scarce resource.						
Can impact be avoided, managed or mitigated?	Yes, to some extent.						
Mitigation measures: • The only possible mitigation measure is the avoidance of high sensitivity areas by the design layout, and this has already been implemented during the design phase.							

10.2 Flora and Terrestrial Fauna

According to a map of DEA-registered projects as at July 2018, there are no other renewable energy applications in the immediate vicinity of the site, with the nearest facilities being the Golden Valley, Amakhala Emoyeni and Middleton Wind Energy projects near to Cookhouse. Apart from these wind energy projects, there are also some solar energy developments around Pearston west of the project site. The solar projects are however on the plains and do not affect the same environment as the Highlands project. Given the distance and extent of these different developments, it is clear that the current level of cumulative impact around the Highlands site is relatively low. From a terrestrial ecology point of view, there are also few linkages between the different facilities and as such the potential disruption of ecological processes is unlikely. The major broad-scale ecological corridors that are likely to be operating in the area include an east-west corridor along the great escarpment to the north of the site as well as a north-south and east-west corridor associated with the bands of thicket vegetation that occur on the western slopes of the site going through to Jansenville in west and south towards Kirkwood. As the development footprint in these areas remains very low, it is highly unlikely that these would be impacted to a significant degree by renewable energy development. Given the location and extent of current developments in the area, the Highlands WEF would generate habitat loss equivalent to approximately 200 ha and while

this would contribute to habitat loss at the local scale, broader implications for cumulative impacts would remain low.

10.3 Freshwater and Wetlands

In the assessment of this project, the surrounding projects within a 35km radius of the site were assessed. From an aquatic environment standpoint, Highlands does not share any of the same direct subquaternary catchment and thus the other projects are too far removed. It would also not share any of the new roads, as it has been shown in the past that the access roads have always had some form of impact on aquatic systems, while internal structures (hard stands and turbines) to a lesser degree. Presently, no significant cumulative impacts were identified as these are also located outside of the delineated aquatic systems and their buffers for the proposed site.

In the assessment of this project, the surrounding projects within a 35 km radius of the site were assessed, including a number of Solar projects. The author has also reviewed the outcomes of the remaining projects as part of this EIA or other EIA / WUL applications in the region. All of the projects have indicated that aquatic impact avoidance as part of their layouts design process coupled mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts while improving the drainage or hydrological conditions within these rivers has been included to result in a cumulative impact that would be negligible. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation is implemented by the other projects, noting only a small number of projects ever reach the construction phase and that flows within these systems are sporadic.

Impact Phase: Cumulative Phase							
Impact description: Overall cumulative impact during the construction and operational phases							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes				
Will impact cause irreplaceable loss or resources?			Yes				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures: • Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region; • Install properly sized culverts with erosion protection measures at the present road / track crossings.							
Residual Impact			Residual impacts will be negligible after appropriate mitigation.				

10.4 Avifauna

Details regarding the routes and lengths of the grid connection power lines for all the projects considered were not all available, and therefore a precautionary approach has been adopted and the cumulative impact of power line collisions (particularly involving Blue Crane and Ludwig's Bustard) is rated as high.

If all operational facilities implement appropriate and effective mitigation as outlined by their respective specialists, and if all mitigation measures outlined in this report are

implemented for the proposed Highlands development, the cumulative impact after mitigation is likely to have moderate Significance.

Impact Phase: Cumulative Phase							
Impact description: Cumulative impact of all impacts on avifauna.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	M	H	Negative	H	M	M
With Mitigation	H	M	M	Negative	M	L	M
Can the impact be reversed?	Partially						
Will impact cause irreplaceable loss or resources?	Possibly						
Can impact be avoided, managed or mitigated?	Partially						
Mitigation measures: • All mitigation measures listed above and recommended for other projects listed above must be adhered to.							

10.5 Bats

The cumulative assessment is combined with the WEF. The potential cumulative impact to bats from the Highlands South Grid connection is expected to be of low significance.

Impact Phase: Cumulative Phase							
Impact description: Cumulative Impacts Cumulative indirect impacts to bats, such as those relating to changes to the physical environment (e.g. roost and habitat destruction) are likely to be low across the cumulative impact regions. Cumulative direct impacts to bats, specifically those related to bat mortality, are likely to be higher. For non-migratory species cumulative direct impacts could have a medium or high significance before mitigation but could reduce to medium or low with appropriate turbine siting and operational mitigation if determined as being necessary based on operational monitoring. Direct impacts on migratory species (i.e. the Natal long-fingered bat) may be high before mitigation but could also reduce to medium with appropriate turbine siting and operational mitigation. However, these ratings would be dependent on all other surrounding wind energy facilities also adopting similar mitigation strategies to reduce impacts to bats. Limited data are available on the actual impacts to bats at the nine operational facilities in the cumulative impact region. In addition, pre-construction monitoring data of bat activity are not a good predictor of the impacts that may be expected at operational wind farms (Hein et al. 2013), limiting their use in understanding and predicting cumulative impacts. Data from one operational wind farm in the cumulative impact region (approximately 130 km south of the proposed Highlands WEFs) which we were able to access suggested that impacts to bats are high. No current information is available to suggest that operational mitigation strategies are being applied at this specific facility. The addition of wind farms in the cumulative impact region may therefore have negative consequences particularly for the north-eastern subpopulation of the migratory Natal long-fingered bat. However, because of a lack of published data on the impact of wind energy facilities on bats in South Africa, and limited baseline data on bat population size and demographics, the confidence in this assessment is low.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	H	M	H	Negative	H	M	L
With Mitigation	H	M	L	Negative	M	M	M
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	Yes						

Can impact be avoided, managed or mitigated?	Yes
Mitigation measures: • As this impact is unlikely to occur, no mitigation options are provided.	
Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.

10.6 Noise

The cumulative impact assessment considers the cumulative effects of the proposed development, and other renewable energy projects within 35 km of the proposed development. Two such other projects have been identified:

- Middleton Wind Energy farm; and
- Pearston Solar Farm.

Each of the above are located more than 20 km from the proposed Development. As such, there is no possibility of cumulative impacts. The cumulative assessment therefore only considers the cumulative effects of the six components of the proposed development.

Impact Phase: Construction Phase

Impact description: Construction of Tracks and Hardstanding

2 no. Tracked Excavators

1 no. Articulated Dump Truck

1 no. Bulldozer

1 no. Vibratory Roller

6 no. Haulage Trucks per hour

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H

Can the impact be reversed?	No
Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Yes

Mitigation measures:

- Acoustic enclosures/screens should be used to contain noise-generating/equipment;
- Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible;
- Plant and equipment covers and hatches should be properly;
- Silenced equipment should be used where possible;
- Plant should be turned off when not in use;
- Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms;
- The use of vehicle horns should be limited to emergency use only;
- Good public relations should be maintained with local residents that may be affected by noise from site operations.

Impact Phase: Construction Phase

Impact description: Excavation and Concreting of Turbine Foundations

1 no. Tracked Excavator

1 no. Concrete Mixer Truck with pump and boom arm

2 no. Poker Vibrators

1 no. Dump Truck (tipping fill)

1 no. Roller (rolling fill)

1 no. concrete Batching Plant

1 no. Lorry

6 no. Haulage Trucks per hour

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- Acoustic enclosures/screens should be used to contain noise-generating/equipment;
- Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible;
- Plant and equipment covers and hatches should be properly;
- Silenced equipment should be used where possible;
- Plant should be turned off when not in use;
- Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms;
- The use of vehicle horns should be limited to emergency use only;
- Good public relations should be maintained with local residents that may be affected by noise from site operations.

Impact Phase: Construction Phase

Impact description: Turbine Erection

1 no. Wheeled Mobile Crane

1 no. Mobile Telescopic Crane

1 no. Diesel Generator

2 no. Torque guns

5 no. Haulage Trucks per hour (Turbine Delivery)

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- Acoustic enclosures/screens should be used to contain noise-generating/equipment;
- Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible;

- Plant and equipment covers and hatches should be properly;
- Silenced equipment should be used where possible;
- Plant should be turned off when not in use;
- Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms;
- The use of vehicle horns should be limited to emergency use only;
- Good public relations should be maintained with local residents that may be affected by noise from site operations.

Impact Phase: Construction Phase							
Impact description: Generator (Night-time Use)							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	M	Negative	L	L	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- Acoustic enclosures/screens should be used to contain noise-generating/equipment;
- Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible;
- Plant and equipment covers and hatches should be properly;
- Silenced equipment should be used where possible;
- Plant should be turned off when not in use;
- Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms;
- The use of vehicle horns should be limited to emergency use only;
- Good public relations should be maintained with local residents that may be affected by noise from site operations.

Impact Phase: Operational Phase							
Impact description: Operation – Day Wind Turbines, Wind Turbine Auxiliary Plant, Transmission Line and Substation							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						

Mitigation measures:

- None required

Impact Phase: Operational Phase							
Impact description: Operation – Night Wind Turbines, Wind Turbine Auxiliary Plant, Transmission Line and Substation							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**

Without Mitigation	L	H	M	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • Installation of turbines with lower noise emission than those assumed within this report; and • Shutdown of selected turbines at night under relevant wind directions; or • Removal of selected turbines from the proposed Development. • The removal of Turbines 16 and 17 will reduce impact at receptor 6.							

10.7 Heritage, Archaeology and Palaeontology

In general heritage information from the area is very limited and the cumulative assessment below is thus based partly on the author's specialist knowledge of the landscape and the likely distribution of heritage resources within it. Only four other projects from within a 35 km radius are known. These are the proposed Middleton Wind Energy Project and three proposed Solar PV projects near Pearston.

It is concluded that the cumulative impact significance of the proposed South WEF is Low. It can be argued that, following effective mitigation, our scientific understanding of the palaeontology of this region of the Eastern Cape could be markedly improved – a positive cumulative impact outcome that would partially offset the inevitable loss of fossils during WEF construction. The confidence for this cumulative impact assessment is *medium*.

Impact Phase: Cumulative Phase							
Impact description: Impacts on archaeological resources Archaeological resources may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	L	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No, once archaeological artefacts are disturbed/destroyed the site cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, heritage resources are regarded as unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then archaeological mitigation can be easily effected (there are no identified no-go areas within the present footprint).						
Mitigation measures: • Commission an archaeological walk-through survey to identify sites within final footprint • Carry out any archaeological mitigation for sites of cultural significance that cannot be avoided							

Impact Phase: Cumulative Phase
Impact description: Impacts on graves

Graves may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No, once graves are disturbed/destroyed they cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, every grave is unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then exhumation can be effected (avoidance is strongly preferred).						
Mitigation measures: • Commission an archaeological walk-through survey to identify graves within final footprint • Carry out exhumation of graves that cannot be avoided							

Impact Phase: Cumulative Phase							
Impact description: Impacts to the cultural landscape The cultural landscape would be altered through the addition of a new 'layer' comprising of large wind turbines and related infrastructure.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	M	Negative	M	H	H
With Mitigation	M	M	M	Negative	M	H	H
Can the impact be reversed?	Yes, if the facility is decommissioned and the land rehabilitated then the impacts would cease.						
Will impact cause irreplaceable loss or resources?	No, because there are many other areas with very similar cultural landscape character.						
Can impact be avoided, managed or mitigated?	No, it is not possible to avoid the impacts. However, mitigation measures can very slightly reduce the severity of impacts.						
Mitigation measures: • Minimise cut and fill operations • Minimise unnecessary surface disturbance • Ensure effective rehabilitation of the development area after construction and again after decommissioning • Further measures would be as described by the visual assessment practitioner.							

10.8 Visual

The development of the proposed Highlands WEFs, when seen together with the existing wind farms and power lines in the vicinity, would result in cumulative visual impacts resulting in further change to the largely rural character to the area.

Besides the proposed Highlands WEFs, there are existing Eskom powerlines parallel with the R63 Route, an approved solar PV farm near Pearston and a proposed Middleton wind farm south of Cookhouse on the N10 National Route, both within 35 kilometres of the Highlands site.

The Environmental Impact Report (EIR) for the Solar PV Farm near Pearston indicated that the visual impact would be moderate both before and after mitigation, (CEN, 2012). No specialist visual assessment was included in the EIR and no negative cumulative impacts were identified. Except for the brief Scoping Report, no further information could

be found on the proposed Middleton Wind Energy Facility, including specialist visual studies.

The fact that the proposed Highlands WEFs fall within the gazetted Cookhouse REDZ means that it would form part of a renewable energy node.

Given that the renewable energy projects mentioned above are not within viewing distance of each other and that they form part of REDZ, the cumulative visual impact significance is considered to be low in the local context.

10.9 Social

Impact Phase: Operational Phase							
Impact description: Cumulative visual impact associated with the establishment of a WEF on the areas rural sense of place and character of the landscape							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	M	L	Negative	L	M	M
With Mitigation	M	M	L	Negative	L	M	M
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The recommendations contained in the VIA should be implemented.							

Impact Phase: Operational Phase							
Impact description: Cumulative impact associated with the establishment of a number of renewable energy facilities that has the potential to place pressure on local services, specifically medical, education and accommodation							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	L	L	Negative	L	L	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by implementing effective mitigation.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The Eastern Cape Provincial Government, in consultation with the SBDM and BCRLM and the proponents involved in the development renewable energy projects in the SBDM and BCRLM area should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the SBDM and BCRLM.							

Impact Phase: Operational Phase							
Impact description: Cumulative impact associated with the establishment of a number of renewable energy facilities in the region that will create employment, skills development and training opportunities, creation of downstream business opportunities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	M	H	M	Positive	M	L	H
With Mitigation	M	H	M	Positive	H	M	H
Can the impact be reversed?	Yes, by not implementing the project.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: • The proposed establishment of suitably sited renewable energy facilities within the SBDM and BCRLM should be supported.							

10.10 Traffic and Transportation

The 140 MW power project in Middleton (approximately 35 km from Highlands WEF) is still in process and possibly that construction could coincide with the Highlands South WEF Grid Connection construction.

It is estimated that the Middleton (wind energy) project would generate on average around 41 trips to site per day assuming the project is built in just under a year. It is estimated that this would include 3 to 4 abnormal vehicle trips (from Ngqura Port) to site per day for 87 days. Apart from a few ISO truck container deliveries, other vehicle trips are more local in nature.

The 5 solar PV applications in Pearston area, totalling 230 MW, are expected to generate some 10 heavy vehicle trips to site per day (from Port Elizabeth or Koega) and some 6 buses and some 80 light vehicle trips (mostly staff and workes arriving in the AM and departing in the PM, from nearby towns such as Pearston and Somerset East).

As a worst case scenario it is assumed that all these developments could coincide with the Highlands South WEF Grid Connection trips to site, along the N2 and N10.

Impact Phase: Cumulative Phase							
Impact description: Negligible Impacts							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	No						
Mitigation measures: • Cumulative Impacts are negligible. No mitigation measures are required.							

11 SUMMARY OF FINDINGS

This BAR has provided a description of the proposed Highlands South Wind Energy Facility Grid Connection. It has also discussed the need and desirability of the proposed project. The environmental legislation and planning contexts for the proposed Grid Connection has been documented, including the proposed site's baseline environment. Specialist investigations and detailed assessments have been conducted for the following areas of study:

- Geology, soils and agriculture;
- Freshwater and wetlands;
- Flora and terrestrial fauna;
- Avifauna;
- Bats;
- Noise;
- Cultural Heritage, Archaeology and Palaeontology;
- Visual.
- Social; and
- Traffic and Transport;

The above studies assessed the potential impacts of the proposed development. A summary of the potential impacts is included in the table below.

Table 11.1 Summary of Grid Connection Alternatives Impacts

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Grid Alternative 1 and 2							
Construction and Decommissioning Phase							
Soil degradation	L	M	M	Negative	M	M	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Cumulative Phase							
Regional loss of agricultural land use	L	M	L	Negative	L	L	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Wetlands and freshwater							
Grid Alternative 1 and 2							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Impact on localized surface water quality	L	M	L	Negative	M	H	H
With	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Mitigation							
Cumulative Phase							
Cumulative Impact	L	M	L	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Terrestrial Ecological Impacts							
Grid Alternative 1 and 2							
Construction Phase							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*H*
Faunal Impacts	L	L	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Operational Phase							
Soil Erosion	L	H	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Alien plant invasion	L	H	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Decommissioning Phase							
Faunal impacts	L	L	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Soil erosion	L	M	M	Negative	M	M	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Alien plant invasion	L	H	M	Negative	M	H	H
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*H*
Avifauna							
Grid Alternative 1 and 2							
Construction Phase							
Destruction of habitat used	M	M	M	Negative	M	H	M

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
by birds (Alternative 1)							
With Mitigation (Alternative 1)	*L*	*L*	*M*	*Negative*	***L***	*L*	*M*
Disturbance / Displacement	M	M	M	Negative	M	H	M
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*M*
Operational Phase							
Bird mortality from power line collision	H	M	H	Negative	H	H	M
With Mitigation	*M*	*M*	*H*	*Negative*	***M***	*M*	*M*
Bird mortality from electrocution	M	M	M	Negative	M	M	H
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*H*
Disturbance / Displacement	M	M	M	Negative	M	M	M
With Mitigation	*L*	*M*	*M*	*Negative*	***L***	*L*	*M*
Decommissioning Phase							
Disturbance / Displacement	M	M	M	Negative	M	H	M
With Mitigation	*M*	*M*	*M*	*Negative*	***L***	*L*	*M*
Cumulative Phase							
Cumulative impact	H	M	H	Negative	**H**	M	M
With Mitigation	*H*	*M*	*M*	*Negative*	***M***	*L*	*M*
Bats							
Grid Alternative 1 and 2							
Construction Phase							
Roost disturbance	L	L	L	Negative	L	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Roost destruction	L	H	L	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Habitat Modification	L	L	L	Negative	L	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Operational Phase							
Collision with transmission lines	L	M	L	Negative	L	L	M
With Mitigation	*L*	*M*	*L*	*Negative*	***L***	*L*	*M*
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	L
With Mitigation	H	M	L	*Negative*	M	M	M
Heritage and Archaeology							
Grid Alternative 1 and 2							
Impacts on archaeological resources	L	H	L	Negative	L	L	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts on graves (Alternative 1)	L	H	H	Negative	M	L	H
With Mitigation (Alternative 1)	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts on graves (Alternative 2)	L	H	H	Negative	M	L	H
With Mitigation (Alternative 2)	*L*	*H*	*L*	*Negative*	***M***	*L*	*H*
Impacts to the cultural landscape	L	M	L	Negative	M	H	H
With Mitigation	*L*	*M*	*L*	*Negative*	***M***	*H*	*H*
Cumulative Phase							
Impacts on archaeological resources	L	H	L	Negative	M	M	H
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts on	L	H	H	Negative	M	L	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
graves							
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*H*
Impacts to the cultural landscape	M	M	M	Negative	M	H	H
With Mitigation	*M*	*M*	*M*	*Negative*	***M***	*H*	*H*
Palaeontology							
Grid Alternative 1 and 2							
Impacts to palaeontological resources	L	H	L	Negative	L	L	M
With Mitigation	*L*	*H*	*L*	*Negative*	***L***	*L*	*M*
Visual							
Grid Alternative 1 and 2							
Rural sense of place.- Construction	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Rural sense of place.- Operational	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H
Rural sense of place.- Decommission	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Neutral	L	L	M
Social							
Grid Alternative 1 and 2							
Construction Phase							
Employment and business opportunities	M	L	M	Positive	M	M	H
With Mitigation	*H*	*L*	*H*	*Positive*	***M***	*H*	*H*
Presence of construction workers	M	L	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Influx of job-seekers	M	L	L	Negative	L	L	M
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*M*
Risks to livestock and farming infrastructure	M	L	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Risk of grass fires	M	L	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Noise, dust, waste and safety impacts	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Establishment of access roads and the construction camp	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Operational Phase							
Employment and business opportunities	M	M	L	Positive	M	M	H
With Mitigation	*M*	*M*	*M*	*Positive*	***M***	*H*	*H*
Powerline pylons on the rural landscape	L	H	M	Negative	M	H	H
With Mitigation	*L*	*H*	*M*	*Negative*	***M***	*H*	*H*
Decommissioning Phase							
Loss of jobs and associated income	M	M	M	Negative	M	M	H
With Mitigation	*M*	*L*	*L*	*Negative*	***L***	*L*	*H*
Cumulative Phase							
Visual Impact	M	M	L	Negative	L	M	M
With	*M*	*M*	*L*	*Negative*	***L***	*M*	*M*

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Mitigation							
Employment opportunities	M	H	M	Positive	M	L	H
With Mitigation	*M*	*H*	*M*	*Positive*	***H***	*M*	*H*
Traffic							
Grid Alternative 1 and 2							
Construction Phase							
Vehicle Worker Crashes	L	L	H	Negative	M	L	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road degradation	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road dust	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Intersection safety	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*H*	*Negative*	***M***	*L*	*M*
Operational Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
With Mitigation	*n/a*	*n/a*	*n/a*	*Negative*	***n/a***	*n/a*	*n/a*
Decommissioning Phase							
Minor road degradation	L	L	M	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Minor road dust	L	L	H	Negative	M	M	M
With Mitigation	*L*	*L*	*L*	*Negative*	***L***	*L*	*M*
Cumulative Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
With Mitigation	*n/a*	*n/a*	*n/a*	*Negative*	***n/a***	*n/a*	*n/a*

12 IMPACT STATEMENT

All specialist studies have indicated that either of the alternatives proposed for the development grid connection from the proposed Highlands South WEF to the existing Eskom Transmission line would be acceptable from an environmental perspective (Figure 12.1).

The location of the project site lies within the Cookhouse Renewable Energy Development Zone (REDZ), which are areas which the Council of Scientific and Industrial Research (CSIR) has identified as geographical areas best suited for the roll-out of wind energy projects in South Africa. The identified areas are part of the strategic environmental assessment (SEA) that the CSIR conducted for wind and solar energy, on behalf of the national Department of Environmental Affairs (DEA). No environmental fatal flaws have been identified, and should all the recommended mitigation measures be implemented by the applicant, it is anticipated that, overall, impacts would be of low negative significance (biophysical impacts) or of medium positive significance (social upliftment). With reference to the information provided at this stage of the project cycle, the confidence in the assessment is regarded as acceptable.

Consideration must be given to the fact that this proposal is dependent on the approval and construction of the proposed Highlands South WEF (separate application), and should the latter not be approved, the likelihood of this proposal for the Highlands South Grid Connection being implemented is low. The reason for the separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed grid connection may become the property of Eskom, and operation and maintenance thereof would not be controlled by the applicant.

Taking into consideration the findings of the BA process for the proposed project and the fact that recommended mitigation measures have been used to inform the project layout design, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of negative impacts associated with the implementation of the proposed project have been mitigated to acceptable levels. While the residual impacts of the project will have an impact on the local environment the extent of the benefits associated with the implementation of the projects will benefit a much larger group of people, in terms of renewable energy supply and positive local and regional economic impact.

Overall, it is recommended that the Highlands South Grid Connection be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the specialist reports.

12.1 Conditions to be included in the EA

All recommendations and proposed mitigation measures detailed in the specialists report (Volume II) and EMPr (Appendix B) must be implemented and adhered to.

12.1.1 Agriculture and Soils

No additional conditions.

12.1.2 Ecology

No additional conditions.

12.1.3 Freshwater and Wetlands

Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off.

All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores

should be more than 32 m from any demarcated water courses, unless agreed otherwise with the Environmental Control Officer (ECO).

An ECO, with a good understanding of the local flora must be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using selected species detailed in this report.

All alien plant re-growth must be monitored, and should it occur these plants should be eradicated.

It is further recommended that a comprehensive rehabilitation plan be implemented from the project onset within areas of disturbance (inclusion of buffers) to ensure a net benefit to the aquatic environment. This should from part of the suggested walk down as part of the final EMPr preparation. The walkdown is required as the final cut/fill and embankments for roads and other structures could not be provided at this point, thus it would be important to evaluate in terms of the aquatic environment and evaluate the need for a Water Use License / GA for these areas.

12.1.4 Avifauna

Prior to construction, the avifaunal specialist should conduct a site walkthrough covering the final road and power line routes to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded (or timed to be outside of an applicable breeding season).

During the site walkthrough the specialist must determine the power line spans of the grid connection route that will require marking devices [Bird Flight Diverters (BFDs)] to increase visibility.

Install bird flight diverters as per the instructions of the specialist which may include the need for modified BFDs fitted with solar powered LED lights on certain spans.

12.1.5 Bats

No additional conditions.

12.1.6 Noise

No additional conditions.

12.1.7 Visual

Ensure that visual management measures are included as part of the EMPr, monitored by an Environmental Control Officer (ECO), including siting of the construction camp and stockpiles, dust suppression and litter control measures, as well as rehabilitation of borrow pits and haul roads, with monthly reporting to an environmental management team.

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the maintenance of rehabilitated areas, control of signage, lighting and wastes on the site, with interim inspections by the ECO.

12.1.8 Heritage, Archaeology and Palaeontology

- A final walk-down survey of the authorised footprints should be carried out at least 6 months before the start of construction in order for any archaeological mitigation requirements to be determined and carried out;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need

to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

12.1.9 Social

No additional conditions.

12.1.10 Traffic and Transportation

No additional conditions.

ARCUS

Appendix A:

Declaration of Independence and Curriculum Vitae

JANUARY 2019

APPENDIX 9
9.1 DECLARATION OF THE EAP

I, _____Ashlin Bodasing_____, declare that –

- I act as the independent environmental assessment practitioner in this application;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I will take into account, to the extent possible, the matters listed in Regulation 18 of the Regulations when preparing the application and any report relating to the application;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority, unless access to that information is protected by law, in which case it will be indicated that such information exists and will be provided to the competent authority;
- I will perform all obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in section 49B of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

- ~~I have a vested interest in the proposed activity proceeding, such vested interest being:~~

  _____

  _____

  _____

  _____

Signature of the environmental assessment practitioner

Arcus Consultancy Services South Africa (Pty) Ltd

Name of company:

12 September 2018

Date

CURRICULUM VITAE

Ashlin Bodasing

Technical Director and Environmental Assessment Practitioner

Email: ashlinb@arcusconsulting.co.za Tel: +27 (0) 21 412 1529

Specialisms

- Environmental Impact Assessments
- Environmental Management Plans
- Environmental Feasibility Studies
- Environmental Due Diligence and Compliance
- Client Relationship Management

Summary of Experience

Ashlin Bodasing is a Technical Director at Arcus Consultancy Services South Africa (Pty) Ltd. She manages the Arcus South African office and the team based in Cape Town.
Having obtained her Bachelor of Social Science Degree (Geography and Environmental Management) from the University of Kwa-Zulu Natal; she has over eleven years' experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management, environmental impact assessments and public participation. She has also been actively involved in a number of industrial and infrastructural projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment, green and brown field coal mines, as well as renewable energy facilities, both wind and solar. Ashlin has excellent Project Management experience and has gained major project experience in the development of Environmental Impact Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies. Experience also includes International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental due diligence reviews. She has worked in Mozambique, Namibia, Botswana, Lesotho and Zimbabwe.

Professional History

2017 – Present – Technical Director, Arcus Consultancy Services South Africa
2015 - 2017 – Team Leader, Arcus Consultancy Services Ltd
2012 – 2015 – Lead Environmental Officer, Tweefontein Optimisation Project, Glencore / Xstrata Coal Mine, Witbank, Mpumalanga, South Africa (secondment)
2007-2015 - Senior Environmental Assessment Practitioner, Parsons Brinckerhoff Africa
2005-2007 – Environmental Consultant, WSP Environment and Energy

Ashlin spent over 2 years at the Glencore (previously Xstrata Coal SA) – Tweefontein Optimisation Project, as the sole environmental officer permanently on site overseeing all their construction projects, ensuring contractor compliance to EMP and Environmental Authorisations. This included the construction of the internal and external infrastructure packages. Roles include ensuring all construction and development are in line with the EIA and EMP for the project. Areas of responsibility include the Mine Infrastructure Area, the Explosives Magazine Area, construction of a secondary school, construction of residential houses, and the rail load out facility. Role also included review of environmental impact assessment applications and reports submitted to the department of environmental affairs for the project.

Qualifications and Professional Interests

- **University of Kwa-Zulu Natal, 2004**
  Bachelor of Social Science (Geography and Environmental Management)

Project Experience

<u>Environmental Impact Assessments</u>

- **San Kraal Wind Energy Facility, 2016- present**. Project Director (client liaison) and EAP.

- **Phezukomoya Wind Energy Facility, 2016 – present**. Project Director (client liaison) and EAP.
- **Kolkies and Karee Wind Energy Facilities, 2016-2016**. Project Director (Client liaison) and EAP.
- **Komsberg East and West Wind Energy Facilities 2015-2016**. Project Director (Client Liaison) and EAP.
- **Umsinde Emoyeni Wind Energy Facilities – 2015- present.** Project Director (Client Liaison) and EAP.

Ecological Impact Assessments and Monitoring

- **Komsberg Wind Farms, 2015-2016.** Project Director (Client Liaison), coordination and management of ecologists (bird and bat), review of techncial and specialists impact assessments.
- **Kolkies and Karee Wind Energy Facilities 2015-2016.** Project Director (Client Liaison), coordination and management of bird and bat specialists and review of technical and impact assessment reports.
- **Umsinde Wind Energy Facilities, Additional Bird Monitoring**. Project Director. Coordination and management of bird specialists and review of technical reports.
- **Kap Vley Wind Energy Facility, Bird and Bat Pre-Construction Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Highlands Wind Energy Facility, Bird and Bat Pre-Construction Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.
- **Hopefield Wind Farm –Operational Monitoring.** Project Manager. Coordination and management of bird and bat specialists, review of technical reports.
- **Gouda Wind Farm – Operation Monitoring.** Project Director. Coordination and management of bird and bat specialists, review of technical reports.

Feasibility Studies and Due Diligence Reviews

- **Ecological due diligence for IFC PS6 – Wind Energy Developments:** Project Manager. Review and reporting on bird and bat specialist reports to IFC/World Bank Standards – Various sites across South Africa.
- **Power Plant – Ghana**. Project Manager Compilation of environmental due diligence for refinancing, IFC and World Bank Standards, on behalf of Botswana Development Corporation.
- **Ecological Feasibility Study.** Project Director. Review of the feasibility of a site for a wind energy facility in relation to bats.
- **Environmental Feasibility Study.** Project Director and EAP. Review of a proposed site for the development of industrial facility.

Previous Project Experience

Environmental Scoping and Impact Assessments and Project Management for:

- eThekwini Municipality
- Moreland Developments
- RBCH – Bulk Materials and Handling Facility
- SAPREF
- Mittal Steel Permit Amendment
- Transnet Projects
- ArcelorMittal South Africa
- MCA-Lesotho
- Talbot Group Holdings (Australian Mining Company)

- Ncondezi Energy – Mozambique

Environmental Management Plans and Compliance Monitoring

- Nongoma Road Monitoring – Compliance Monitoring
- eThekwini Municipality - Taxi Holding Areas: Canberra Road and Umgeni Road Compilation of the EMP; and Bi-monthly compliance monitoring (site visits) and reporting.
- EMP for Kwezi V3 - Kwamashu Fuel Tank Exemption
- eThekwini Municipality - Ridgeview Road – Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - Phoenix Overhead Transmission Lines – Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - E8546 E8699 Compliance Monitoring
- eThekwini Municipality and Merz and Mclellen - Environmental Assessment and EMP
- EMP for eThekwini Municipality - Parlock Switching Station

Training and Auditing

- Petronet Alien Plant Training - Compilation of the training material for alien plant identification and removal methods.
- eThekwini Municipality - Taxi Holding Areas – Canberra and Umgeni Road - Contactor and workforce training.
- eThekwini Municipality - Kingsway Road Taxi Rank - Contactor and workforce training.

Environmental Reviews / Terms of Reference

- Biotherm Energy - Environmental Project Manager: Independent review of environmental impact assessment reports and management plans compiled for 3 wind farms in the Western Cape and 2 PV Solar Plants in the Northern Cape, to ensure compliance to IFC and World Bank Standards.
- Government of Zimbabwe – Hwange Power Station - Environmental Project Manager: Compilation of the Terms of Reference for Environmental Management Plan and Environmental and Social Audit of the Hwange Power Plant in Zimbabwe.

Pre-Feasibility Studies

- Pre-feasibility studies for eThekwini Municipalit, Investec, Sekoko Coal Resources, Mulilo, Sekoko Mining and MCA-Lesotho for renewable energy, coal mines and power plants.

Appendix B:

Environmental Management Programme (EMPR)

For

THE PROPOSED ELECTRICAL GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE FOR THE HIGHLANDS SOUTH WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

On behalf of

HIGHLANDS SOUTH WIND ENERGY FACILITY (RF) (PTY) LTD

JANUARY 2019

Prepared By:

Arcus Consultancy Services South Africa (Pty) Ltd
Registered in South Africa No. 2015/416206/07

Glossary of Terms

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development

Contractor: Persons/organisations contracted by the Developer to carry out parts of the work for the proposed project

Engineer / Project Director (PD): Person/organisation appointed by the Developer to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environment: The environment is defined as the surroundings within which humans exist and that are made up of – the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental and Social Manager (ESM) also known as the Environmental Control Officer (ECO): Person/organisation appointed by the Developer who will provide direction to the Principal Agent concerning the activities within the Construction site. The ECO will also be responsible to liaise with the independent auditor who will conduct an environmental audit during the construction phase of the project according to the provisions of the Environmental Management Programme.

Independent Auditor: The person or entity who will conduct an environmental audit during the construction phase of the project according to the provisions of the Environmental Management Programme and Environmental Authorisation.

Environmental Management Programme (EMPR): The EMPR is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPR contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPR specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Therefore the EMPR will be a working document, which will be reviewed when necessary, or if required by the authorities. A revision will be done once the detailed design of the proposed development has been completed.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase: detailed final designs, micro siting, etc. will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement revegetation of a disturbed area and the insurance of a stable land surface. Revegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase.

Project Area: This refers to the authorised area for the proposed development to take place. Farm portions numbers are outline in the EMPR.

Local Community: People residing or present in the region and near the construction activities, including the owners and/or managers of land affected by construction, workers on the land, and people in nearby towns and villages.

Public: Any individual or group concerned with or affected by the Project and its consequences, including the local community, local, regional, and national authorities, investors, workforce, customers, consumers, environmental interest groups, and the general public.

Construction Area / Site: The land on which the Project is to be located. It includes the site, construction campsite, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMPR (particularly the specifications for rehabilitation) is relevant for all areas disturbed during construction.

Access Roads and Tracks: All newly established roads and tracks, and areas cleared or driven over to provide access to/from the construction areas, and for the transportation of the construction workforce, equipment and materials.

Environmental Impact: The effect of an activity on the environment, whether desirable or undesirable. Undesirable or negative environmental impacts will result in damage and/or pollution of, or detriment to the environment, or in danger to the public, whether immediate or delayed.

Environmental Incident: An unexpected or sudden occurrence related to the Project, including major emissions, spills, fires, explosions, floods or erosion leading to serious or potentially serious negative environmental impacts.

Fugitive Dust: Can be defined as natural and/or human-associated dust becoming airborne due to the forces of wind or human activity.

Fauna and Flora / Plants and Animals: Any individual or group of micro-organisms, plants or animals.

General Waste and Construction Rubble It includes waste paper, board, cardboard, benign organic and domestic waste and uncontaminated construction debris such as used bricks, wood, waste concrete, unused subsoil and rubble from excavations or demolished structures.

Heritage Sites and Artefacts: Heritage sites and artefacts can be defined as any object or site of cultural, historical, archaeological or palaeontological significance found in or on the land. Historical objects are objects older than 50 years with architectural, historical, scientific, cultural, social, spiritual, linguistic, technological or aesthetic value. For example: buildings or parts thereof, graves or burial sites, milestones, numismatic objects (i.e. coins and beads), and military objects.

Archaeological objects include material remains resulting from human activity which are older than 100 years and which are in a state of disuse, such as tools, artefacts, human and hominoid remains and artificial features and structures.

Palaeontological objects include any fossilised remains of animals or plants.

Hazardous Substances: Substances which are potentially dangerous and may affect human and/or environmental health. This would be because of the substances' inherent chemical and physical composition, which could be toxic, poisonous, flammable, explosive, carcinogenic or radioactive. Hazardous waste includes, but is not limited to: human excrement, the by-products and wastes associated will the use of hazardous substances (i.e. used fuel, oil, lubricants and solvents), as well as items such as spent batteries, old oil filters, light bulbs, tyres, circuit boards, etc. which requires special collection and handling. When left abandoned, even substances such as scrap metal, wire, tins, broken glass and plastic could be harmful to people, wild and domestic animals. For example: plastic could be ingested by animals; people and animals could be injured by broken glass or metal objects; and animals could get trapped in drums, tins and bottles or get entangled in plastic or metal wiring. Even if buried, such objects may become exposed over time due to wind erosion, scavengers or future human activities. Because of the sensitive nature of the area, these substances are all regarded as 'hazardous waste' for the purposes of this EMPR.

Hydrological Features: Hydrological features include, but are not limited to:

- wetlands;
- open water;
- vegetated drainage channels;
- subterranean water;
- marine environments;
- estuarine environments.

Life Support Systems: Life support systems include, but are not limited to: an ecological system in which its outputs are vital for sustaining specialised habitats; an ecological system in which its outputs are vital for sustaining human life (e.g. water purification).

Mitigation: Environmental management measures designed to avoid, limit or remedy undesirable environmental impacts.

Monitoring: Structured observation, measurement and evaluation of environmental data over a period of time to assess the efficiency of environmental mitigation and rehabilitation measures.

Rehabilitation: Measures implemented to restore a damaged Environment.

Sensitive Sites: Environmentally sensitive sites include, but are not limited to:

- Areas with high conservation value due to the presence of important plant specimens, pristine habitats, high biodiversity, important water resources or heritage features and artefacts;
- Areas particularly prone to erosion once disturbed (i.e. steep slopes);
- Vulnerable areas with low potential for rehabilitation / slow rate of recovery (i.e. rock outcrops, steep slopes); and
- Areas in close proximity of sensitive receptors, such as farm homesteads, viewpoints or tourist stopovers.

Specialised habitats: Specialised habitats include, but are not limited to, areas which are:

- Priority breeding habitats;
- Refuge areas;
- Vital for species survival (important for, part, or all of its life cycle);
- Essential for species performance;
- Cryptic habitats, etc.

TABLE OF CONTENTS

Figure list:

1 INTRODUCTION

1.1 Background

WKN Windcurrent South Africa (Pty) Ltd (the Developer) are proposing to develop the Highlands Wind Energy Facilities (WEFs), and associated infrastructure including Grid Connection Infrastructure near the town of Somerset East, in the Eastern Cape Province (Figure 1).

There are six components to the proposed development, representing three development phases under separate applications:

- Highlands North WEF:
- Electrical Grid Connection and Associated Infrastructure for Highlands North WEF;
- Highlands Central WEF;
- Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
- Highlands South WEF; and
- **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF.**

In order to bid in the Renewable Energy Independent Power Producers Procurement Programme, the developer is require to bid the projects under a special purpose vehicle (SPV). For the purposes of the Highlands WEFs, each wind farm and grid connection per phase will share the SPV, which will be the applicant for the environmental application and environmental authorisation.

Highlands South WEF and Grid Connection will share Highlands South Wind Energy Facility RF (Pty) Ltd, as the applicant.

Arcus Consultancy Services Pty ('Arcus') have been appointed by WKN Windcurrent to compile and submit Environmental Management Programme (EMPR) to the Department of Environmental Affairs (DEA) as part of the Basic Assessment process for the Highlands WEFs and associated infrastructure including grid connection. The Highlands South WEF and the Highlands South Electrical Grid Connection have both separately applied for environmental authorisation from the DEA and therefore require separate EMP's.

This document represents the Environmental Management Programme (EMPR) for the **Electrical Grid Connection and Associated Infrastructure required for the Highlands South WEF**.

This document, the environmental management programme (EMPR) must be seen as dynamic, and be updated when and if required, throughout the lifecycle of the project.

The EMPr outlines measures to be implemented in order to minimise adverse environmental degradation associated with construction of the proposed development. It serves as a guide for the contractor and the construction workforce on their roles and responsibilities concerning environmental management on site, and it provides a framework for environmental monitoring throughout the construction and operational period of the proposed development.

1.2 Details of the Applicant and the Environmental Assessment Practitioner

Details of Applicant	
Project Applicant	Highlands South Wind Energy Facility (RF) (PTY) Ltd
Company Registration	2015/425520/07
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1.3 Purpose and Aims of this Document

According to the Western Cape's Department of Environmental Affairs and Development Planning, Guideline for Environmental Management Plan (2005), and Environmental Management Programme (EMPR) is defined as "an *environmental management tool used to ensure that undue or reasonably avoidable adverse impact of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the project are enhanced."*

This EMPR outlines measures to be implemented in order to minimise adverse environmental degradation and enhance positive impacts associated with wind energy facility grid connections and associated infrastructure. It serves as a guide for the contractor and the workforce on their roles and responsibilities concerning environmental management on site, and it provides a framework for environmental monitoring throughout the construction and operational periods. The purpose of the EMPR is to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
  - Minimise disturbance of the natural environment;
  - Prevent pollution of land, air and water;
  - Protect indigenous flora and fauna;
  - Prevent soil erosion and facilitate re-vegetation;
  - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
  - Adopt the best practicable means available to prevent or minimise adverse environmental impacts;
  - Identify and mitigate against any potential impact on ecology;
  - Describe all monitoring procedures required to identify impacts on the environment; and
  - Train employees and contractors with regard to environmental obligations.

2 PROJECT DESCRIPTION

The proposed Grid Connection will connect Substation C1 and C2 to the Eskom transmission line. Two route alternatives are proposed (Figure 2). It will be either a 66 kV line, and /or a 132 kV line. The maximum length of the line will be 20 km with a 31 m wide servitude. A 300 m corridor surrounding the proposed line alternatives is to be assessed (150 m each side).

The type of structures which will support the overhead lines may include:

- Concrete, steel or wood monopoles;
- Guy line supported steel structures;
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

Further technical details of the proposed grid connections are presented in Table 2.1.

Table 2.1: Technical Details of Proposed Grid Connections

Applicable DEA Request	Technical Detail
Area occupied by inverter/transformer stations/substations	200 x 250 m substation compound Single storey
Capacity of on-site substation	33 / 132 kV or 33 / 66 kV
Area occupied by both permanent and construction laydown areas	9 000 m^2 per phase
Transmission line	Power lines from the on-site substation to Eskom Transmission line would be 66 kV or 132 kV lines (single or double string) on single pole pylon (wooden, steel or concrete).
Transmission line length	20 km
Servitude corridor	31 m width
Lay down area and construction camp.	Adjacent to on-site substation 150 m x 60 m = 9 000 m^2 (0.9 ha) per phase

Electricity will be transferred from the on-site substation to Eskom's existing grid network in the area via 66 kV or 132 kV overhead power lines.

The route for the line will include a servitude corridor of up to 31 m in width.

As such, the Highlands South Grid Connection corridor will cover an area of approximately 62 hectares. The access tracks and any other required infrastructure will be placed within the corridor, the final placement of which will depend, *inter alia*, on the local geotechnical and topographical conditions, as well as on environmentally sensitive areas (Figure 3).

The final centre line for the power line will be determined in line with the requirements of the specialist studies conducted and the sensitive areas determined by these specialists.

Following completion of construction and commissioning, it is envisaged that the infrastructure will be transferred to Eskom for operation should this be necessary.

2.1 Construction Phase

2.1.1 Establishment of a Servitude

A servitude is by definition "the right to use someone else's land for a specified purpose", in this case the right to erect, operate and maintain a power line, as well as access rights to carry out these activities. Ownership of the land remains with the original landowner who signs a servitude agreement and keeps overall responsibility for the land.

A topographical survey will be conducted along the preferred alternative to inform the final route and design of the tower foundations, pylons and structures. Once the final servitude route has been confirmed construction of the power line begins. The servitude is generally cleared of wooded plant species and any protruding alien vegetation to reduce fire risk and prevent shortages with vegetation, in line with this EMPR and Eskom requirements and guidelines.

Although existing roads and tracks will be used as much as possible, access roads for minor vehicles may be created for the construction phase as well as for periodic maintenance, in negotiation with the relevant landowner.

2.1.2 Construction of Power Line Tower Structures

The type of structures which will support the overhead lines is yet to be determined and may include:

- Concrete, steel or wood monopoles;
- Guy line supported steel structures;
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

The preferred type of tower is dependent on a variety of factors, including the terrain, cost, conductor size, live line compatibility and required electrical characteristics. Tower type selection will therefore be based on additional on-site investigations during the detailed design phase of the project. Similarly, the foundation size and type will depend on the type of tower selected as well as conditions of the local terrain. Tower steel is typically delivered on a 24-ton truck, or on smaller vehicles in difficult terrain. The tower structures are assembled on the ground and erected on the constructed foundations using an 8-ton crane truck. Following this the power lines and conductors are strung from tower to tower. The average span between two 132 kV towers is 200 m but can vary between 150 and 375 m depending on the terrain and ground profile.

2.1.3 Stringing High Voltage Cables

Power lines to be strung are delivered to the site on cable drums that are placed along the servitude at regular intervals. If the area is inaccessible these may be delivered by helicopter. A pilot cable is then laid down by a pilot tractor driven along the route of the power line. This is used to string the conductors between towers in sections from bend to bend by the means of a pulley system. The correct tension required to reduce sagging and comply with minimum clearance distances is then obtained before clamping the conductors and cutting off any excess cabling.

2.1.4 Rehabilitation of disturbed areas and protection of erosion sensitive areas

Following the construction of the grid connection all areas outside of the servitude and other areas required for maintenance will be rehabilitated in accordance with this EMPR.

2.2 Operational Phase

The life span of the power line is approximately 25 years, during which time on-going maintenance is required. Eskom will be responsible for the operational phase and decommissioning phase and must undertake maintenance in accordance with this EMPR and 'Eskom Standard for Bush Clearance and Maintenance within Overhead Powerline Servitudes' (Eskom 2003) and the Transmission Vegetation Management Guideline (Eskom 2009). The guideline promotes minimising the removal of vegetation other than alien vegetation unless it poses a fire hazard.

2.3 Decommissioning Phase

Eskom will be responsible for the decommissioning phase. This will include unstringing the power line cables, disassembling the towers, removing the foundations and rehabilitating the servitude according to this EMPR.

3 LEGAL FRAMEWORK

The following non-exhaustive list of legislation is applicable and was considered in this report:

- Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996);
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Environmental Conservation Act, 1989 (Act No. 73 of 1989);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004);
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- Conservation of Agricultural Resources Act, 1983(Act No. 43 of 1983);
- National Water Act, 1998 (Act No. 36 of 1998);
- Aviation Act, 1962 (Act No. 74 of 1962);
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Forest Act, 1998 (Act No. 84 of 1998);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Roads Act, 1998 (Act No. 7 of 1998);
- Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- Performance Standards and Equator Principles, 2013 (IFC, June 2013);
- Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000; as amended).

An application for Environmental Authorisation, in term of the National Environmental Management Act, Act 107, 1998 (NEMA), Environmental Impact Assessment Regulations, 2014 (as amended, 2017) was submitted to the Department of Environmental Affairs,

- Electrical Grid Connection and Associated Infrastructure for Highlands North WEF;
- Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
- Electrical Grid Connection and Associated Infrastructure for Highlands South WEF;
- Highlands North WEF;
- Highlands Central WEF; and
- Highlands South WEF.

The six application were submitted together to the DEA, as part of the basic assessment process for the proposed development.

This EMPR is based on the principles of Integrated Environmental Management (IEM), which promotes to achieve a balance between conservation and development. IEM prescribes a methodology which ensures the complete integration of environmental management principles into all stages of the development process. The basic principles of IEM as per Department of Environmental Affairs and Tourism (2004) are:

- Clarified accountability and responsibility
- Adaptive process and flexibilities
- Identify and define alternative option
- Community empowerment
- Continual improvement
- Dispute resolution
- Environmental justice
- Equity
- Global responsibilities
- Holistic decision-making
- Informed decision-making
- Institutional co-ordination
- Integrated approach

- Polluter pays
- Precautionary approach
- Rigour
- Stakeholder engagement
- Sustainability
- Transparency

The EMPR represents an environmental management tool as advocated by the IEM. It aims to ensure that the conditions of authorisation associated with the project are fulfilled and adhered to during all phases of the projects life cycle.

All listed activities which potentially form part of the proposed grid connections, and which require environmental authorisation, are included in the application for Environmental Authorisation prepared and submitted to the DEA. The activities are indicated in Table 3.2. The EMPR will need to be updated to include the recommendations and requirements that are outlined in the Environmental Authorisation, should this project be authorised by the DEA.

Table 3:2: Listed Activities that form part of the Highlands South Grid Connection Applications

Listing Notices 1 and 3 07 April 2017	***Listed Activity***	***Description of project activity that triggers listed activity***
Listing Notice 1 GN R 327 Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.*	132 kilovolt overhead powerlines will be installed to transfer electricity from the on-site substation to the existing on-site Eskom transmission line.
Listing Notice 1 GN R 327 Activity 19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*	The construction of the overhead powerline will include the excavation of soil within 32 m of a watercourse and infilling/deposition may exceed 5 cubic metres and in some instances may exceed 10 cubic metres. Borrow pits for the sourcing of aggregate material will be required.
Listing Notice 1 GN R 327 Activity 27	*The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation*	The infrastructure associated with the overhead powerline will require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 3 GN R 324 Activity 4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres a. Eastern Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Servitude road will be wider than 4 m. The site falls outside of an urban area and parts of the site fall with a NPAESF and a Tier 2 CBA.
Listing Notice 3 GN R324 Activity 14	*The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a*	Bridges and infrastructure associated with the overhead powerline will be constructed within 32 m of a watercourse(s). The site lies outside of an urban area and a portion of the site falls with an NPAESF area and a Tier 2 Critical Biodiversity Area.

Listing Notices 1 and 3 07 April 2017	***Listed Activity***	***Description of project activity that triggers listed activity***
	watercourse, measured from the edge of a watercourse; *a. Eastern Cape* *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	
Listing Notice 3 GN R324 Activity 23	*The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *a. Eastern Cape* *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	The construction of the overhead powerline will include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse. The site lies outside of any urban area, and parts of the site fall within a Critical Biodiversity Area.

4 IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This section forms the core of the EMPR and outlines the specific mitigation measures for those key impacts identified in the section above.

4.1 Environmental Awareness and Compliance

The philosophy that has been used for the compilation of this management programme is derived from the principles of the National Environmental Management Act, 1998 (Act No. 107 of 1998) which states that development must be socially, economically and environmentally sustainable. Sustainable development requires that:

- The disturbance of ecosystems and loss of biodiversity are avoided (minimised or remedied);
- Pollution and degradation of the environment are avoided or minimised and remedied; Waste is avoided or minimised and re-used or re-cycled where possible and otherwise disposed of in a responsible manner;
- A risk averse and cautious approach is applied;
- Negative impacts on the environment and on people's environmental rights be anticipated; and, prevented and where they cannot altogether be prevented, are minimised and remedied.

The Act makes provision that anyone who causes pollution or degradation of the environment is responsible for preventing impacts occurring, continuing or recurring and for the costs of repair of the environment.

4.2 Roles and Responsibilities for Good Environmental Management

The developer, together with the each appointed contractor will be responsible for environmental management on site during the construction and operational phases of the proposed development. Specific roles and responsibilities are highlighted in the table below.

The Project Company

The Project Company is defined as the legal entity with ownership of the project. It is responsible for adherence to the conditions of the Environmental Authorisation (EA) issued by the DEA, as well as all any other licensing or permitting requirements and ultimately accountable. The Project Company appoints construction and operation managers. During the construction phase of the proposed grid connections the Project Company will be Highlands South Wind Energy Facility (RF) (Pty) Ltd. It is envisaged that ownership of the grid connections and associated infrastructure will then be transferred to Eskom Holdings SOC Limited, who will be responsible for the operation and decommissioning phases of the projects.

The Project Company is responsible for managing the construction of the proposed projects. It must appoint suitably experienced engineers who will oversee the management of all activities on site, as well as a suitably qualified Environmental Control Officer. It is responsible for ensuring that the engineers are aware of all EMPR requirements and that these are being correctly implemented and that the Contractor's activities are being monitored. It must ensure that the Contractor is aware of and contractually bound to the provisions of this EMPR. All relevant environmental management procedures required should be included in the tender documents. It must also ensure that the contractor remedies and environmental problems timeously and to the satisfaction of the authorities or ECO if necessary. The project company must notify the authorities should environmental problems not be remedied timeously.

The Contractor

The Contractor is responsible for project delivery, management of the construction programme and quality control. The contractor must inform employees and sub-contractors of their obligations to minimise any environmental impacts caused by their activities and ensure they are informed of the requirements of the EMPR and their implementation. It is the contractor's obligation to promote environmental awareness and an understanding of the environmental features of the construction site. This includes basic training in the identification of protected species as well as archaeological and paleontological objects that could occur on site. This EMPR must be made available to them by the contractor who is also responsible to implement safe, environmentally acceptable working methods, and compliance with Health, Safety and Environment (HSE) responsibilities.

Developer Representative – Environmental Manager

- Review and approve EMPR prior to authorisation by DEA.
- Review and approve any EMPR updates or amendments.
- Ensure environmental requirements are integrated into the project plans, method statements and tender processes.
- Support the site environmental control officer during the construction phase, to ensure implementation of the EMPR.
- Follow up and close out all environmental incidents and non-conformances.
- Appointment a suitably qualified independent environmental control officer during the construction phase.

Principal Contractor Representative - Environmental Control Officer

An independent environmental consultant will arrange for inspections of the construction activities and EMPR implementation throughout the construction phase. After each inspection, the ECO will produce a monitoring report that will be submitted to the client, DEA and Eastern Cape Environmental Department. Relevant sections of the minutes of customary (monthly) site meetings will be attached to the monitoring report.

The Environmental Control Officer (ECO) will be responsible for overseeing the implementation of the EMPR during the construction and operations phases, and for monitoring, reviewing and verifying compliance of the contractor with the EMPR, record-keeping and updating of the EMPR as and when necessary.

The ECO will:

- Be fully knowledgeable with the contents of the EMPR;
- Be fully knowledgeable with the contents of all relevant environmental legislation and ensure compliance with them;
- Ensure that the contents of the EMPR are communicated to the contractor, all site staff, and the contractor and /or site manager are made aware of the contents of the EMPR, through presentations and discussions;
- Ensure that compliance to the EMPR is monitored by regular and comprehensive inspection of the site and surrounding areas;
- Report on any incidents of non-compliance and ensure mitigation measure are implemented as soon as practical.

During *construction*, the Environmental Control Officer will be responsible for the following:

- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Daily / weekly (depending on the extent of construction activities, at any given time) monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPR, using a monitoring checklist that is to be

prepared by an independent environmental assessment practitioner at the start of the construction phase;
- Preparation of the monitoring report based on the site visit;
- Conducting an environmental inspection on completion of the construction period and signing off the construction process with the Construction Manager; and
- Maintain an Incidents Register and Complaints Register on site.

During *operation*, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMPR for the operation phase;
- Ensure that the necessary environmental monitoring takes place as specified in the EMPR;
- Update the EMPR and ensure that records are kept of all monitoring activities and results; and
- Maintain an Incidents Register and Complaints Register on site.

During *decommissioning*, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMPR for the decommissioning phase; and
- Conducting an environmental inspection on completion of decommissioning and "signing off" the site rehabilitation process.

4.3 Training and Induction of Employees

The contractor has a responsibility to ensure that all personnel involved in the project are aware of and are familiar with the environmental requirements for the project. The EMPR shall be part of the terms of reference (ToR) for all contractors, sub-contractors and suppliers. All Contractors have to give some assurance that they understand the EMPR and that they will undertake to comply with the conditions therein. All senior and supervisory staff members shall familiarise themselves with the full contents of the EMPR. They shall know and understand the specifications of the EMPR and be able to assist other staff members in matters relating to the EMPR.

The Contractor must ensure that all staff working on site has an environmental induction. The presentation can include the following topics;

- What is meant by "Environment"?
- Why the environment needs to be protected and conserved.
- How construction activities can impact on the environment.
- What can be done to militate against such impacts?
- Awareness of emergency and spills response provisions.
- Social responsibility during construction e.g. being considerate to local residents.

A detailed environmental management and training program must be developed. The purpose of this is to ensure that all staff and workers understand what is required of them. The main components of the program can incorporate the following:

- Concept of sustainability and the reasons for good environmental management and practice
- Potential environmental impacts
- Mitigation measures
- Establishing a chain of responsibility and decision making
- Specific training requirements of certain staff, and the potential hazardous associated with the job.
- Methodologies to be used for field sampling
- Training in the use of field equipment
- Training in identification of non-compliance situations and procedures to be followed in such instances

- Reporting requirements
- Fire management
- HIV/AIDS

4.4 Complaints Register and Environmental Incidents Book

The Contractor must record any complaints received from the community. The complaint must be brought to the attention of the site manager and Environmental Control Officer, who will respond accordingly.

The following information will be recorded:

- Time, date and nature of the complaint;
- Response and investigation undertaken; and,
- Actions taken and by whom.

All complaints received will be investigated and a response (even if pending further investigation) will be given to the complainant within 7 days.

All environmental incidents occurring on the site will be recorded. The following information will be provided:

- Time, date, location and nature of the incident,
- Actions taken and by whom.

4.5 Construction Environmental Monitoring

Environmental audits must be undertaken by an independent environmental consultant who will act as the Environmental Control Officer twice monthly, and on a daily basis or what is deemed necessary by the ECO during times of heavy earth works and vegetation clearing, in order to ensure compliance of all aspects of the EMPR.

In order to facilitate communication between the ECO and the Resident Engineer and Contractor, it is vital that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of the project team before being conveyed to the Contractor. In this way, penalties as a result of non-compliances with the EMPR may be justified as failure to comply with instruction from the highest authority.

4.6 Dealing with Non Compliance with the EMPR

There may be difficulties encountered with carrying out the mitigation measures within the EMPR, this may result in non-compliance with the EMPR. It may be possible that the contractor and or the developer in place procedures to motivate staff members to comply with the EMPR and to deal with deal with non-compliance. The developer must make this known to the contractor at the earliest stage possible, even during the tender phase.

4.7 EMPR Amendments and Instructions

No EMP amendments shall be allowed with the approval of the DEA. Amendments may be possible, following discussions with the relevant ECO or environmental consultant, who may propose EMPR amendments on behalf of the developer or issue EMPR instructions, either corrective actions, remediation or rehabilitation. These correction action must be completed within the specified timeframes.

5 DESIGN PHASE / PRE–CONSTRUCTION PHASE MITIGATION MEASURES

The objectives of the pre-construction phase are:

- To promote environmental awareness.
- To define roles and responsibilities for environmental management;

- To ensure suitable environmental training and induction to all contractors, sub-contractors and labourers; and
- To ensure that all legal obligations and contractual conditions have been met prior to commencing of construction.

Mitigation measures for Legal Compliance.

- Appoint an independent environmental control officer
- Appoint an internal environmental co-ordinator or environmental officer, to oversee day to day environmental activities.
- Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.
- Before construction begins, all areas to be developed must be clearly demarcated with fencing, by a qualified surveyor.
- The contractor must ensure compliance with conditions described in the environmental authorisation.
- No construction camps are allowed on site. No workers are allowed to stay overnight in the construction area.
- Confirm with ECO, suitable sites for the construction camps (equipment and batching etc.) and storage areas for materials. All construction equipment must be stored within this construction camp and all associated oil changes etc. (no servicing) must take place within this camp.
- Unskilled labourers must be drawn from the local market where possible.
- Training of site staff.
- Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts.
- Project Manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.
- Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.
- No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.

The developer must ensure that the following mitigation measures are applied to the proposed project prior to the construction phase. These measures must be included in an updated EMPR to be submitted to the DEA for approval.

5.1 Final Site Assessment by Specialists

Prior to the submission of the final layout plan to the DEA for approval, the following specialists must visit the site to assist with the micro-siting the layout and do a walkthrough of all power lines:

- Flora and fauna specialists
- Avifaunal specialist
- Aquatic specialist
- Palaeontologist

Following the selection of pylons to be used for the project, the developer must update the layout plan, this together with the following management plans, to be developed, must be submitted to the DEA for approval:

- Traffic Management Plan – this plan will include the necessary arrangements to transport all equipment and infrastructure to site, including the necessary road transport permits.
- Construction Site Traffic Management Plan – this will be in the form of a site layout, showing the flow of traffic during the construction phase taking into consideration existing land users.
- Storm water Management Plan – once the final layout plan has been produced the appointed responsible engineers must produce a storm water management plan for the site, during the construction and operational phases of the project.
- A health and safety plan must be drawn up to ensure worker safety.

The construction of the transmission line may result in water crossings for the expansion of existing and / the construction of new bridges over water courses. The developer must ensure that water use licences are applied for and approved for these, prior to the start of construction. All mitigation measures proposed in the water use licence must be adhered to and included in an updated EMPR and submitted to the DEA for approval.

Develop a Project Layout and Access Plan to show the intended use of the area. The plan shall clearly indicate and/or describe the location and details of:

- Servitudes.
- Areas and routes to be cleared – including the size / width of the cleared areas.
- The construction campsite and rest areas to be used during construction.
- Waste disposal sites to be used during construction.
- Sources of construction materials.
- Power supply during construction.
- Existing roads and tracks to be used as transportation routes, and routes to gain access to construction areas.
- New tracks deemed necessary to provide access to construction activities.
- Any informal residential structures found within the property.
- Affected land use, 1:50 year floodlines.
- Sensitive areas.

5.2 Method Statements

The Contractor shall provide Method Statements for approval by the ECO and the Engineer prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the construction phase of the EMPR, when called upon to do so by the Engineer or ECO.

A Method Statement is a "live document" in that modifications are negotiated between the Contractor and the ECO/project management team, as circumstances unfold. All Method Statements will form part of the construction phase of the EMPR documentation and are subject to all terms and conditions contained within the construction phase of the EMPR.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the ECO and the Engineer to understand the Contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks.

For each instance where it is requested that the Contractor submit a Method Statement to the satisfaction of the Engineer and ECO, the format must clearly indicate the following:

- What - a brief description of the work to be undertaken;
- How - a detailed description of the process of work, methods and materials;
- Where - a description/sketch map of the locality of work (if applicable); and
- When - the sequencing of actions with due commencement dates and completion date estimates.
- Who – The person responsible for undertaking the works described in the Method Statement;
- Why – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the ECO, Engineer and, where practical and deemed necessary, should be endorsed as being acceptable by the environmental representative of the Relevant Authority.

Prior to construction the developer must ensure that the contractor supply the following method statements:

- Vegetation clearing;
- Cement mixing;
- Hazardous waste management;
- Emergency preparedness and response;
- Hazardous spills clean up;
- Topsoil stockpiling management;
- Laydown area management; and
- Hazardous materials management.

5.3 Permit Requirements

Activities undertaken during site preparation, construction and operation may require additional permits, over and above the Environmental Authorisation. Highlands South WEF RF (Pty) Ltd is responsible for ensuring that they hold the necessary permits in order to comply with national and local regulations. Additional permit requirements are described below.

5.3.1 Borrow Pits

A borrow pit refers to an open pit where material (soil, sand or gravel rock) is removed for use at another location. Highlands South Wind Energy Facility RF (Pty) Ltd or their contractors may want to use borrow pits for certain earthworks operations, such as the construction of roads, embankments, bunds, berms, and other structures.

The establishment of borrow pits is regarded as a mining activity and is legislated in terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA). A mining permit must be obtained from the Department of Minerals and Energy prior to the establishment of borrow pits on the site.

5.3.2 Water Use License

There are licensing procedures that need to be followed for particular "water uses". Water uses that may be of relevance to the development and associated road construction include the following:

- Taking of water from a water resource, including a water course, surface water, estuary or aquifer (i.e. borehole)
- Altering the bed, banks, course or characteristics of a water course; and/or
- Impeding or diverting of a flow in a water course.

Under the National Water Act, 1998 (Act No. 36 of 1998), either General Authorisation or a Water Use Licence must be applied for.

5.3.3 Vegetation Search and Rescue

Under the Forests Act, 1998 (Act No. 84 of 1998) (NFA), a license must be applied for from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal or disturbance of any protected trees on the site, in terms of the List of Protected Tree Species promulgated under the NFA.

5.4 Site Establishment

The object of site establishment is to ensure that an appropriate site is selected for the construction camp/site office and that the site office is managed in an environmentally responsible manner with minimal impact on the environment.

Mitigation Measures

Before establishing the construction office areas, carefully plan the layout and develop a Construction Site Office Plan[1]. The Construction Site Office Plan shall provide a description of the site and shall show, on a reasonably scaled map, the intended use of the site. Indicate and/or describe the location, size / quantity / capacity and design of:

- Access routes;
- Ablution facilities (including details on the handling of sewage and wastewater);
- On-site waste management facilities (waste containers, etc.);
- Design of bunds and other structures for containment of hazardous substances;
- Fencing;
- Water storage and supply;
- Power supply (for cooking, space heating, lighting, etc.);
- Fire extinguishers, first aid kit and any other relevant safety equipment;
- Other structures and buildings (offices, storerooms, workshops, etc.);
- Other storage areas and stockpiles (i.e. topsoil, construction materials, equipment, etc.).

Location of areas to be reinstated upon completion of the construction period, providing measures to be used for reinstatement.

- An area within the site must be demarcated for a construction site office, which will include storage area. This area must be fenced off.
- Site establishment shall take place in an orderly manner and all required amenities shall be installed at the lay down area before the main workforce move onto site.
- The construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction.
- The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.
- The Contractor shall supply waste collection bins and all solid waste collected shall be disposed of at a registered landfill.
- Potable water for use by on site workers must be made available on a daily basis at the site office and the working areas on site.
- A certificate of disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.

[1] To form part of the Project Layout and Access Plan.

- The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt or buried on site.

Siting, Establishing and Management of Storage Material and Facilities

- Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.
- Storage areas must be designated, demarcated and fenced.
- Storage areas must be secure so as to minimize the risk of crime. They must also be safe from access by children / animals etc.
- Fire prevention facilities must be present at all storage facilities.
- Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s).
- These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Engineer.
- Any water that collects in the bund must not be allowed to stand and must be removed immediately and the hydrocarbon digestion agent within must be replenished.
- All legal compliance requirements with respect to Fuel storage and dispensing must be met.
- All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, SANS codes and other relevant requirements.
- Areas for storage of fuels and other flammable materials must comply with standard fire safety regulations
- Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire.
- The tank must be erected at a safe distance from buildings, boundaries, welding sites and workshops and any other combustible or flammable materials.
- Symbolic safety signs depicting "No Smoking", "No Naked Flames" and "Danger" are to be prominently displayed in and around the fuel storage area.
- The capacity of the tank must be clearly displayed and the product contained within the tank clearly identified.
- There must be adequate fire-fighting equipment at the fuel storage and dispensing area or areas.
- The storage tank must be removed on completion of the construction phase of the project.
- All such tanks to be designed and constructed in accordance with a recognised code (international standard).
- The rated capacity of tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage.
- Only empty and externally clean tanks may be stored on the bare ground. All empty and externally dirty tanks must be sealed and stored in an area where the ground has been protected.
- Any electrical or petrol-driven pump must be equipped and positioned so as not to cause any danger of ignition of the product.
- If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used.
- The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use.

- All waste fuel and chemical impregnated rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.
- The amounts of fuel and chemicals stored on site must be minimised.
- Storage sites must be provided with bunds to contain any spilled liquids and materials.
- These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
- Clear signage must be placed at all storage areas containing hazardous substances / materials.
- Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Storage areas containing hazardous substances / materials must be clearly signed.
- Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.
- A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes must only be disposed of at licensed landfill sites designed to handle hazardous wastes.
- The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.
- All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.
- Any spillage, which may occur, shall be investigated and immediate action must be taken.

5.4.1 Site Clearance

Vegetation clearance must preferably be phased as required to work in certain areas, rather than clearing of the entire site initially. If this is not practical and the entire site is cleared at the start of the contract, it is to be stabilized immediately to control dust. Where ever possible, vegetation shall be trimmed rather than cleared.

Cleared vegetative material is not to be dumped anywhere other than an approved waste disposal site or an area as agreed to with the ECO.

Wherever possible and where the material is suitable, the material must be chipped for later use as mulch in landscaped areas or for stabilization purposes or it must be dumped at a green waste recycling depot for compost production.

Invasive alien plant species, which are removed from the site, are not to be chipped for mulch if they are in a seed bearing state. Such material is to be disposed of at a suitable waste disposal site. Wherever possible, suitable larger stumps must be made available to the local community as fire wood.

Plant material removed from the site is not to be burnt for disposal on site unless a burning permit has been obtained from the local authority.

Sensitive ecosystems in the vicinity of the areas of construction must be demarcated (e.g. using danger tape or droppers) prior to any construction activities, so that these can be avoided.

Removal of vegetation must be kept to a minimum, and cleared areas must be re-vegetated after clean-up. A detailed planting plan must be developed, in consultation with a landscaper and ecologist.

Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development

Demarcate all areas to be cleared with construction tape or similar material. However caution must be exercised to avoid using material that might entangle fauna.

An alien control and monitoring program must be developed to ensure that the site is cleared of alien plants (as listed under the Conservation of Agricultural Resources Act 43 of 1983 - as amended/updated) and kept free from alien plants for the duration of the construction phase.

A low cover of vegetation must be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.

5.4.2 Topsoil

Topsoil / top material shall be removed from all areas cleared of vegetation and retained for future landscaping use, where feasible. Top material must exclude litter, building rubble, alien plant material or any other waste.

All topsoil, and specifically any topsoil from areas which are likely to contain bulbs, must be stripped and stockpiled for re-use in rehabilitation. This will constitute at least a 300mm layer.

Topsoil shall be stored in areas demarcated by the ECO and Engineer and in piles not higher than 2 m, and may not be removed from site, or used for any purpose other than in the rehabilitation of the site post-construction. The stockpiles shall not be compacted or disturbed, and shall be domed at the top to promote runoff. The period between the stockpiling of topsoil and its utilization shall be as short as possible, and ideally the topsoil must be transferred to its intended site of use immediately following site clearance and stockpiling. This would also avoid double handling.

Stockpiles that are to be stored for less than three months must be covered with shade-cloth or Geotech fabrics or similarly suitable material to prevent erosion. If stockpiles are to be stored for more than 3 months a protective vegetation layer must be established to cover topsoil stockpiles in order to protect them against erosion and desiccation. If possible, the stockpile must be kept moist in order to maintain the vitality of the vegetation. Vegetation may not consist of weeds, but must comprise of grass or ground covers.

6 CONSTRUCTION MANAGEMENT PLAN AND MITIGATION MEASURES

The following sections form the core of the EMPR during the construction phase of the proposed development. The developer is to ensure that the contractor complies with all mitigation measures during the construction period. The major sources of potential impacts include, the turbine footprint construction, the construction of buildings and infrastructure, the construction of roads and bridges, and vehicle operation, and spillages.

The following is not allowed on site:

- No poaching of any animals or harvesting of any flora;
- No construction camp, for workforce accommodation is allowed on site; contractors are to ensure suitable housing for staff outside of the proposed development footprint.
- No cooking or fires allowed on site;
- No alcohol or drugs are allowed on site.

6.1 Eating Areas

The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient bins, as specified in 4.5.4a shall be present in this area. Any cooking on Site shall be done on well-maintained gas cookers with fire extinguishers present.

6.2 Drinking Water

The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site then the Contractor shall import drinking water to the site.

6.3 Contaminated Water

Water containing such pollutants as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fuel depots/workshops/truck washing areas.

Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the Engineer immediately of any pollution incidents on Site.

If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem.

A Method Statement shall be required for all wash areas where hydrocarbon and hazardous materials, and pollutants are expected to be used. This includes, but is not limited to, vehicle washing, workshop wash bays and paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Engineer.

6.4 Hazardous Substances

Hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) used during construction shall be stored in secondary containers. The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.

If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/ materials to be used, together with the storage, handling and disposal procedures of the materials.

No paint products and chemical additives and cleaners such as thinners and turpentine, may be disposed of on Site. Brush / roller wash facilities shall be established to the satisfaction of the Engineer. A Method Statement, approved by the Engineer, is required.

6.5 Workshop, Equipment, Maintenance and Storage

Where practical, all maintenance of plants on Site shall be performed in the workshop. If it is necessary to do maintenance outside of the workshop area, the Contractor shall obtain the approval of the Engineer prior to commencing activities.

The Contractor shall ensure that in the workshop and other plant maintenance facilities, including those areas where, after obtaining the Engineer's approval, the Contractor carries out emergency plant maintenance, there is no contamination of the soil or vegetation. The workshop shall have a smooth impermeable floor either constructed of concrete or thick plastic covered with sufficient sand to protect the plastic from damage. The floor shall be bunded and sloped towards an oil trap or sump to contain any spillages of substances (e.g.

oil). A Method Statement detailing the design and construction of the workshop must be submitted.

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the Site.

The washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken in the workshop or maintenance areas, and these areas must be equipped with a suitable impermeable floor and sump/oil trap. The use of detergents for washing shall be restricted to low phosphate and nitrate containing and low sudsing-type detergents.

6.6 Dust Control

The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the Engineer and ECO. Dust control measures may include the stabilization of disturbed areas via the rotorvation of straw into the soil surface. In extreme instances, the use of specific dust suppressant additives such as "Dustex" may be necessary in order to limit dust generation from haul roads.

During high wind conditions, the Contractor shall comply with the Engineers instructions regarding dust suppression measures. The Engineer may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

6.7 Potential Construction Phase Impacts

The following impacts are likely to occur during the construction of the proposed transmission line. Specific mitigation measures for each impact is presented in the table below.

- The accidental, negligent, or deliberate spillage or inappropriate disposal of hazardous substances could result in air, soil and water pollution and may affect the health and well-being of people, plants and animals.
- Excessive noise could be made by the construction activity which would affect neighbouring communities.
- Potential damage to the soil structure, soil compaction and loss of soil fertility.
- Loss of the vegetation cover and increased erosion risks.
- Dust related problems.
- Safety hazards to the public, workers and animals in the area.
- Disturbance to local hydrology from construction activities.
- Pollution of surface water bodies.
- Dust can be a nuisance to the construction workforce and to the public and can negatively affect the growth and recovery rate of plants. Potential sources of fugitive dust include, but are not limited to:
    - Demolition of concrete foundations and existing buildings;
    - Grading / movement of soil;
    - Transportation and unloading of construction materials;
    - Vehicular movement over unsurfaced roads and tracks; and,
    - Wind erosion of stockpiles.
- Construction activities will result in the exposure of the soil to erosive factors, i.e. wind and water, and the compaction of the soil in other areas;

- Illegal poaching and collection of animals and plant material.
- Loss of established indigenous and exotic habitat
- Unnecessary trampling of vegetation and harm to animals.
- Degradation of the scenic quality due to the major earthworks and any unsightly structures.
- Damage or loss of important cultural, historical or pre-historical sites and artefacts.
- Damage to existing roads and tracks, power lines, pipelines, etc.
- Dangerous conditions near road.
- Trespassing and illegal access onto land.

Table 6.1 below presents a summary of the potential impacts as assessed by specialists for the construction phase of the Highlands South Grid Connection.

Table 6.2 below provides the mitigation measures to be implemented for the potential impacts identified.

Table 6.1: Summary of Construction Phase Potential Impacts and Significance Rating for the Preferred Alternative

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Soil degradation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	L	L	H
Wetlands and freshwater							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Impact on localized surface water quality	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Terrestrial Ecological Impacts							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H
Faunal Impacts	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	M
Avifauna							
Destruction of habitat used by birds	M	M	M	Negative	M	H	M
With Mitigation	L	L	M	Negative	L	L	M
Disturbance and displacement of birds	M	M	M	Negative	M	H	M
With Mitigation	L	M	M	Negative	L	L	M
Bats							
Roost disturbance	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Roost destruction	L	H	L	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Habitat Modification	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Heritage and Archaeology							
Impacts on archaeological resources	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Impacts on graves (Alternative 1)	L	H	H	Negative	M	L	H
With Mitigation (Alternative 1)	L	H	L	Negative	L	L	H
Impacts to the cultural landscape	L	M	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	M	H	H
Palaeontology							
Impacts to palaeontological resources	L	H	L	Negative	L	L	M
With Mitigation	L	H	L	Negative	L	L	M
Visual							
Construction activities	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Social							
Employment and business opportunities	M	L	M	Positive	M	M	H
With Mitigation	H	L	H	Positive	M	H	H
Presence of construction workers	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Influx of job-seekers	M	L	L	Negative	L	L	M
With Mitigation	M	L	L	Negative	L	L	M
Risks to livestock and farming infrastructure	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Risk of grass fires	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Noise, dust, waste and safety impacts	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Establishment of access roads and the construction camp	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Traffic							
Vehicle Worker Crashes	L	L	H	Negative	M	L	M
With Mitigation	L	L	L	Negative	L	L	M
Minor road degradation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Minor road dust	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Intersection safety	L	L	H	Negative	M	M	M
With Mitigation	L	L	H	Negative	M	L	M

Table 6.2 Construction Phase Mitigation Measures

Mitigation Measure	Responsibility	Frequency
Route Clearing		
Off-road driving and the creation of new tracks, other than those described during Project Layout and Access Plan, are prohibited and will be regarded as unwanted tracks or unwarranted disturbed areas. All unwanted tracks or unwarranted disturbed areas shall be properly rehabilitated	Contractors engineer will be responsible for the creation of new roads. The ECO will be responsible for monitoring this activity	During site establishment Monthly thereafter.
When a new path is created: Carefully plan the route and have it clearly marked out so that drivers exactly know where to drive.	Site engineer/site manager ECO to monitor	Monthly
Establish the track by simply driving over the ground if there are no obvious obstacles (i.e. large rocks, high plants or rough terrain).	ECO to monitor Site engineer/site manager	
Keep tracks as narrow as possible and only drive on marked out routes (as per the Layout and Access Plan).		
No bulldozers will be used in bush clearing outside of the construction footprint. Only inflatable tyre earthmoving equipment must be used to reduce damage to vegetation.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
If obstacles are far enough apart, divert the track around obstacles. Only obstacles that could interfere with the safe construction and operation of the development need to be removed.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Where possible, remove obstacles by hand. Shrubs are to be cut or crushed rather than being completely uprooted in areas where landscaping or rehabilitation will be undertaken on completion of the construction. Leave vegetation in place wherever possible, especially around the perimeter of the site to provide screening and habitat. Indigenous plants can be planted to replace alien vegetation.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Only undertake earthworks in an area if it is unavoidable, and keep the size of platforms as small as possible.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Sensitive sites within the construction area must be demarcated to avoid accidental destruction of sensitive areas. The workforce must be made aware of these areas, and why they are sensitive.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Mitigation Measure	Responsibility	Frequency
Impacts on vegetation and listed or protected plant species resulting from construction activities		
Preconstruction walk-through of the approved development footprint to ensure that sensitive habitats and species are avoided where possible.	Developer / Site Engineer ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Ensure that lay-down and other temporary infrastructure is within low-sensitivity areas, preferably previously transformed areas if possible.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
A large proportion of the impact of the power line would stem from access roads and these must be minimized as far as possible and not be larger than required.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Demarcate sensitive areas in close proximity to the development footprint as no-go areas with construction tape or similar and clearly mark as no-go area.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Alien Plant Invasion Risk		
Wherever excavation is necessary, topsoil must be set aside and replaced after construction to encourage natural regeneration of the local indigenous species.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
The recovery of the indigenous grass layer must be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Mitigation Measure	Responsibility	Frequency
Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Regular alien clearing must be conducted using the best-practice methods for the species concerned. The use of herbicides must be avoided as far as possible.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Increased Erosion Risk		
Dust suppression and erosion management must be an integrated component of the construction approach.	ECO to monitor Site engineer/site manager	Weekly
Regular monitoring for erosion problems along the access roads and other cleared areas.	ECO to monitor Site engineer/site manager	Weekly
Erosion problems must be rectified on a regular basis.	ECO to monitor Site engineer/site manager	weekly
Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season	ECO to monitor Site engineer/site manager	monthly
A low cover of vegetation must be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Disturbance near to drainage lines or the pan must be avoided and sensitive drainage areas near to the construction activities must be demarcated as no-go areas.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Direct Faunal Impacts		
Preconstruction walk-through of the facility to identify areas of faunal sensitivity.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
During construction any fauna directly threatened by the construction activities must be removed to a safe location by the ECO or other suitably qualified person.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Mitigation Measure	Responsibility	Frequency
The illegal collection, hunting or harvesting of any plants or animals at the site must be strictly forbidden. Personnel must not be allowed to wander off the construction site.	ECO to monitor Site engineer/site manager / safety officer	During site establishment Monthly thereafter.
No fires must be allowed on site as there is a risk of uncontrolled fires.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
If any parts of site such as construction camps must be lit at night, this must be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which must be directed downwards.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
No unauthorized persons must be allowed onto the site and site access must be strictly controlled.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
All construction vehicles must adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits must apply within the facility as well as on the public gravel access roads to the site.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
All personnel must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often needlessly persecuted.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Avifaunal Habitat Destruction		
Existing roads and farm tracks must be used where possible	ECO to monitor Site engineer/site manager	Prior to construction
The minimum footprint areas of infrastructure must be used wherever possible, including access road widths and lengths	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
A site specific Environmental Management Programme (EMPR) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. ECOs to oversee activities and ensure that the site specific environmental management programme (EMPR) is implemented and enforced	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.

Mitigation Measure	Responsibility	Frequency
Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final power line routes to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded	ECO to monitor Site engineer/site manager	Post construction
Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the EMPR	ECO to monitor Site engineer/site manager	Throughout construction
Construction of grid infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible	ECO to monitor Site engineer/site manager	Throughout construction
Any clearing of stands of alien trees on site must be approved first by an avifaunal specialist	ECO to monitor Site engineer/site manager	Throughout construction
Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the Environmental Management Programme (EMPR)	ECO to monitor Site engineer/site manager	Throughout construction
The Grid Connection route must, where possible, follow existing linear infrastructure such as roads and power lines, and must be constructed as close as practically possible to the existing infrastructure.	ECO to monitor Site engineer/site manager	Throughout construction
Avifaunal Disturbance and Displacement		
An EMPR must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. ECOs to oversee activities and ensure that the site specific EMPR is implemented and enforced	ECO to monitor Site engineer/site manager	During site establishment. Monthly thereafter.
Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final power line route to identify any nests/breeding/roosting activity of sensitive species as well as any additional sensitive habitats. The results of which may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise	ECO to monitor Site engineer/site manager	During site establishment. Monthly thereafter.
Sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be avoided.	ECO to monitor Site engineer/site manager	Pre-Construction / Design Phase.

Mitigation Measure	Responsibility	Frequency
		During site establishment. Monthly thereafter.
Bat Roost disturbance and/or destruction		
It may be possible to limit roost disturbance and abandonment by avoiding construction activities near roosts. These include trees, caves, rocky crevices and buildings along the grid connection route	ECO to monitor Site engineer/site manager	Design phase
It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence	ECO to monitor. Site engineer/site manager. Developer. Specialist to be appointed.	Pre-Construction / Design Phase. During site establishment. Monthly thereafter.
A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified.	ECO to monitor Site engineer/site manager Developer	Preconstruction / design phase During site establishment Monthly thereafter.
The grid connection route can be designed and constructed in such a way as to avoid the destruction of potential roosts, particularly trees, caves, rocky crevices (if blasting is required) and buildings	ECO to monitor Site engineer/site manager	During blasting activities
No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation.	ECO to monitor Site engineer/site manager	Weekly
It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence.	ECO to monitor Site engineer/site manager	Monthly and as required during construction
Roost searches to continue during construction and operational phases.	ECO to monitor Site engineer/site manager	As required by the specialist
A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified (limited to rocky crevices and buildings).	ECO to monitor Site engineer/site manager Developer	Preconstruction / design phase During site establishment Monthly thereafter.

Mitigation Measure	Responsibility	Frequency
During construction, laydown areas and temporary access roads must be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off-road driving	ECO to monitor Site engineer/site manager Developer	Preconstruction / design phase During site establishment Monthly thereafter.
Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the Environmental Management Programme (EMPR).	ECO to monitor Site engineer/site manager	Post Construction. Weekly thereafter.
A bat specialist must conduct a site walkthrough, covering the final power line routes and the switching station and substation areas, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats.	ECO to monitor Site engineer/site manager Developer	Preconstruction / design phase During site establishment Monthly thereafter.
Loss of riparian systems and water courses		
Where water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint).	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
No vehicles to refuel within drainage lines/ riparian vegetation.	ECO to monitor Site engineer/site manager	Weekly
During the operational phase, monitor culverts to see if erosion issues arise and if any erosion control if required.	ECO to monitor Site engineer/site manager	monthly
Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Impact on riparian systems through the possible increase in surface water runoff from hard surfaces and or roads on riparian form and function		
Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Increase in sedimentation and erosion within the development footprint		

Mitigation Measure	Responsibility	Frequency
Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Impact on localized surface water quality		
Strict use and management of all hazardous materials used on site.	ECO to monitor Site engineer/site manager	Weekly
Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.).	ECO to monitor Site engineer/site manager	Weekly
Containment of all contaminated water by means of careful run-off management on the development site.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Strict control over the behaviour of construction workers.	ECO and safety to monitor Site engineer/site manager	Weekly
Working protocols incorporating pollution control measures (including approved method statements by the contractor) must be clearly set out in the EMPR for the project and strictly enforced.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Appropriate ablution facilities must be provided for construction workers during construction and on-site staff during the operation of the facility.	ECO to monitor Site engineer/site manager	Weekly
Visual		
Access and haul roads to use existing farm tracks as far as possible.	ECO to monitor Site engineer/site manager	During site establishment Weekly
Construction camp, stockpiles and lay-down area to be located out of sight of district roads, possibly in the vicinity of the proposed substation and O&M buildings.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Disturbed areas rather than pristine or intact land to preferably be used for the construction camp. Construction camp and laydown areas to be limited in area to only that which is essential	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Measures to control wastes and litter to be included in the contract specification documents.	ECO to monitor Site engineer/site manager	During site establishment Weekly thereafter.

Mitigation Measure	Responsibility	Frequency
Provision to be made for rehabilitation/ re-vegetation of areas damaged by construction activities.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
Disturbance, damage or destruction of well-preserved fossils at or beneath the ground surface during the construction phase (especially due to bedrock excavations, ground clearance)		
Conduct a pre-disturbance inspection of any infrastructure that is to be positioned on sensitive geology. Sensitive specimens will need to be recorded and removed.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
The employment of a palaeontologist during the construction phase, establishment of on-site curation facilities and identification of a repository for specimens.	ECO to monitor Site engineer/site manager	During site establishment When required during construction.
During the construction phase a chance-finds procedure must be applied should substantial fossil remains such as vertebrate bones, teeth or trackways, plant-rich fossil lenses or dense fossil burrow assemblages be exposed by excavation or discovered within the development footprint.	Environmental Control Officer must safeguard the fossils, preferably *in situ*, and alert the responsible heritage management authority so that appropriate action can be taken by a professional palaeontologist	When required during construction
Archaeological material and rock engravings		
Conduct a final walk down of roads and check pylon positions for archaeological material.	ECO to monitor Site engineer/site manager	During site establishment Monthly thereafter.
In the improbable event of archaeological material being found, this will need to be subject to sampling and removal from site under a permit (Eastern Cape Heritage Authority)	ECO to monitor Site engineer/site manager	Throughout construction
Check dolerite clusters and flat dolerite rafts for rock engravings. Rock engravings must be assigned co-ordinates, photographed (so as to record detail) and moved out of harm's way, or the road adjusted to avoid them.	ECO to monitor Site engineer/site manager	Throughout construction
Graves		
In the event of human bones being found on site, an archaeologist must be informed immediately and the remains removed under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.	ECO to monitor Site engineer/site manager	Throughout construction

Mitigation Measure	Responsibility	Frequency
All identified grave yards must be mapped and co-ordinates given to the developer and the contractor. These areas must be avoided, as far a practical. The contractor is to ensure that the work force are aware of these areas, and buffers applied around them.	ECO to monitor Site engineer/site manager	Throughout construction
Employment and Business Creation Opportunities		
Where reasonable and practical the proponent must appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area	Developer/ site manager	Pre-construction and throughout construction
Where feasible, efforts must be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria	Developer/ site manager	Pre-construction and throughout construction
Before the construction phase commences the proponent must meet with representatives from the BCRLM and BCRLM to establish the existence of a skills database for the area. If such as database exists it must be made available to the contractors appointed for the construction phase	Developer/ site manager	Pre-construction and throughout construction
The local authorities, relevant community representatives and local farmers must 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	Developer/ site manager	Pre-construction and throughout construction
Where feasible a training and skills development programmes for local workers must be initiated prior to the initiation of the construction phase	Developer/ site manager	Pre-construction and throughout construction
The recruitment selection process must seek to promote gender equality and the employment of women wherever possible	Developer/ site manager	Pre-construction and throughout construction
The proponent must liaise with the SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies must be notified of the tender process and invited to bid for project-related work	Developer/ site manager	Pre-construction and throughout construction
Where possible, the proponent must assist local BBBEE companies to complete and submit the required tender forms and associated information	Developer/ site manager	Pre-construction and throughout construction

Mitigation Measure	Responsibility	Frequency
The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, must identify strategies aimed at maximising the potential benefits associated with the project.	Developer/ site manager	Pre-construction and throughout construction
Impacts on family structures and social networks associated with the presence of construction workers		
Where possible the proponent must make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.	Developer/ site manager	Pre-construction and throughout construction
The proponent must consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF must be established before the construction phase commences, and must include key stakeholders, including representatives from the SBDM and BCRLM, farmers and the contractor(s). The MF must also be briefed on the potential risks to the local community and farm workers associated with construction workers.	Developer/ site manager	Pre-construction and throughout construction
The proponent and the contractor(s) must, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code must identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code must be dismissed. All dismissals must comply with the South African labour legislation;	Developer/ site manager	Pre-construction and throughout construction
The proponent and contractor (s) must implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.	Developer/ site manager	Pre-construction and throughout construction
The contractor must provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site.	Developer/ site manager	Pre-construction and throughout construction
Where necessary, the contractors must make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks.	Developer/ site manager	Pre-construction and throughout construction
It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.	Developer/ site manager	Pre-construction and throughout construction
Impacts on family structures, social networks and community services associated with the influx of job seekers		

Mitigation Measure	Responsibility	Frequency
The proponent must implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities;	Developer/ site manager	Pre-construction and throughout construction
Risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the movement of construction workers on and to the site		
The proponent must enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the development will be compensated for. The agreement must be signed before the construction phase commences.	Developer/ site manager	Pre-construction and throughout construction
Contractors appointed by the proponent must provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties.	Developer/ site manager	Pre-construction and throughout construction
The proponent must consider the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. This committee must be established prior to commencement of the construction phase. The Code of Conduct must be signed by the proponent and the contractors before the contractors move onto site.	Developer/ site manager	Pre-construction and throughout construction
The proponent must hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This must be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement must also cover loses and costs associated with fires caused by construction workers or construction related activities.	Developer/ site manager	Pre-construction and throughout construction
The Environmental Management Programme (EMPR) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.	Developer/ site manager ECO to monitor	Pre-construction and throughout construction
The contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Developer/ site manager Safety officer	Pre-construction and throughout construction
The contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This must be	Developer/ site manager Safety officer	Pre-construction and throughout construction

Mitigation Measure	Responsibility	Frequency
contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;		
The housing of construction workers on the site must be strictly limited to security personnel.	Developer/ site manager Safety officer	Pre-construction and throughout construction
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
The proponent must enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities will be compensated for. The agreement must be signed before the construction phase commences.	Developer/ site manager	Pre-construction and throughout construction
The contractor must provide adequate firefighting equipment on-site.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
Contractor must ensure that open fires on the site for cooking or heating are not allowed except in designated areas.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
The contractor must 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 must be taken during the high risk dry, windy winter months.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
The contractor must provide fire-fighting training to selected construction staff.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
No construction staff, with the exception of security staff, to be accommodated on site overnight.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor must also compensate the firefighting costs borne by farmers and local authorities.	Site engineer/ site manager Safety officer	Pre-construction and throughout construction
Potential dust and safety impacts and damage to road surfaces associated with movement of construction related traffic to and from the site		

Mitigation Measure	Responsibility	Frequency
As far as possible, the transport of components to the site along the N10 must be planned to avoid weekends and holiday periods.	Site engineer/ site manager Safety officer and ECO	Pre-construction and throughout construction
The contractor must inform local farmers and representatives from the SBDM and BCRLM Tourism of dates and times when abnormal loads will be undertaken;	Site engineer/ site manager Safety officer and ECO	Pre-construction and throughout construction
The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor.	Site engineer/ site manager Safety officer and ECO	Pre-construction and throughout construction. Monthly
Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis[2], adhering to speed limits and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.	Site engineer/ site manager Safety officer and ECO	Pre-construction and throughout construction. Monthly
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.	Site engineer/ site manager Safety officer and ECO	Daily. Pre-construction and throughout construction
The Contractor must ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined.	Site engineer/ site manager ECO	Daily. Pre-construction and throughout construction
Waste generated during the construction phase must be transported to the registered landfill.	Site engineer/ site manager ECO	Weekly throughput construction
EMPR measures (and penalties) must be implemented to ensure farm gates are closed at all times.	Site engineer/ site manager Developer to implement ECO	Daily. Pre-construction and throughout construction
EMPR measures (and penalties) must be implemented to ensure speed limits are adhered to at all times.	Site engineer/ site manager Developer to implement ECO	Daily. Pre-construction and throughout construction
Impact on farmland due to construction related activities		

[2] Treated effluent (non-potable) water should be used for wetting of roads and construction areas

Mitigation Measure	Responsibility	Frequency
The location of pylons, access roads, laydown areas etc. must be informed by the findings of key specialist studies, including the soil and botanical study. In this regard areas of high potential agricultural soils must be avoided.	Site engineer/ site manager Developer to implement ECO	Weekly. Pre-construction and throughout construction
The developer must consult with affected property owners in order to enable them to factor construction activities into their farming schedules.		
The location of access roads, laydown areas etc. must be discussed with the locally affected landowners in the finalisation process and inputs provided must be implemented in the layout as best as possible.	Site engineer/ site manager Developer to implement ECO	Weekly. Pre-construction and throughout construction
All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., must be rehabilitated at the end of the construction phase. The rehabilitation plan must be informed by input from a botanist with experience in arid regions.	Site engineer/ site manager Developer to implement ECO	Weekly post construction
The implementation of a rehabilitation programme must be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme must be drawn up the Environmental Consultants appointed to undertake the EIA.	Site engineer/ site manager Developer to implement ECO	Tender phase
The implementation of the Rehabilitation Programme must be monitored by the ECO.	Site engineer/ site manager Developer to implement ECO	Weekly
All workers must receive training/ briefing on the reasons for and importance of not driving in undesignated areas;	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Monthly
EMPR measures (and penalties) must be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances must vehicles be allowed to drive into the veld.	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Daily
Disturbance footprints must be reduced to the minimum.	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Monthly

Mitigation Measure	Responsibility	Frequency
Compensation must be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the development. Compensation must be based on accepted land values for the area.	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Monthly
Traffic		
Co-ordinate WEF and GRID build to avoid unnecessary overlapping of construction activities.	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Monthly
Document condition of gravel roads prior to construction.	Site engineer/ site manager ECO	Pre-construction
Upgrade gravel roads to suitable condition for proposed construction vehicles.	Developer to implement ECO	Pre-construction
General Construction Mitigation Measures		
Portable toilets must be supplied to the workforce in areas of activity. One toilet per 14 workers must be implemented. Females must have separate toilets. A licenced contractor must be appointed by the contractor to provide this facility, and ensure that wastes are correctly disposed of. Servicing must take place on a weekly basis, proof of which must be retained on site by the contractor.	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Weekly
Waste skips must be provided in areas of construction activity as well as within the lay down areas, along with waste bins. Wastes must be separated into the following categories: • General waste, compactable and non-compactable • Waste paper recycling • Scrap metal • Globes and fluorescent tubes • Rubber waste • Medical waste • Chemical waste • Hazardous waste	Site engineer/ site manager Developer to implement ECO	Pre-construction and throughout construction. Weekly
Health and Safety		

Mitigation Measure	Responsibility	Frequency
Implementation of safety measures, work procedures and first aid must be implemented on site.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Weekly
Workers must be thoroughly trained in using potentially dangerous equipment	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Weekly
Contractors must ensure that all equipment is maintained in a safe operating condition.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Weekly
A safety officer must be appointed.	Developer to implement	Pre-construction
A record of health and safety incidents must be kept on site.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Weekly
Any health and safety incidents must be reported to the project manager immediately.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction.
First aid facilities must be available on site at all times.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Workers have the right to refuse work in unsafe conditions.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Daily
The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents	Site engineer/ site manager Developer to implement	Pre-construction and throughout construction. monthly checks

Mitigation Measure	Responsibility	Frequency
	ECO and Safety Officer	
An STI and HIV/AIDS awareness campaign must be launched, which is not only directed at construction workers but also at the community as a whole.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Condoms must be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of condoms. The distribution of condoms must be approached with the necessary cultural sensitivity.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Access at the construction site must be controlled to prevent sex workers from either visiting and/or loitering at the construction camp.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily
Ensure that the local community communicate their expectations of construction workers' behaviour with them.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Personal Protective Equipment (PPE) must be made available to all construction staff and their usage must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
No person is to enter the site without the necessary PPE.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily
Pre-construction, construction and operation activities must be undertaken during daylight working hours between the hours of 07:00 – 17:00 on weekdays and 07:00 – 13:00 on Saturdays. No activity will be allowed on Sundays	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
The workforce is to be provided with sufficient potable water and under no circumstances are they to use untreated water from the local watercourses for drinking.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Noise		

Mitigation Measure	Responsibility	Frequency
Construction site yards and other noisy fixed facilities must be located well away from noise sensitive areas adjacent to the development sites.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
All construction vehicles and equipment are to be kept in good repair.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Portable acoustic shields must be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators).	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily
Construction staff working in areas where the 8-hour ambient noise levels exceed 75dBA must wear ear protection equipment.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily
Blasting operations are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions. The number of blasts per day must be limited, blasting must be undertaken at the same times each day and no blasting must be allowed at night.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor and ECO must liaise with local residents on how best to minimise impact, and the local population must be kept informed of the nature and duration of intended activities.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Where possible labour shall be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily

Mitigation Measure	Responsibility	Frequency
Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas must not be allowed.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks
Construction activities must be undertaken during daylight working hours between the hours of 07:00 – 17:00 on weekdays and 07:00 – 13:00 on Saturdays. No activity will be allowed on Sundays.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. Daily
Should any equipment, such as generators on-site, generating excessive noise, they should be fitted with appropriate noise abatement measures.	Site engineer/ site manager Developer to implement ECO and Safety Officer	Pre-construction and throughout construction. monthly checks

7 POST CONSTRUCTION REHABILITATION

7.1 Site Clean Up

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project. The site clean-up shall be to the satisfaction of the Engineer and the ECO.

7.2 Rehabilitation

Where appropriate, the contractor shall employ a suitably qualified person (a botanist with experience in restoration of karoo areas) to rehabilitate areas damaged by construction activities during the course of the project. The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Engineer, or recommended by the aforementioned botanist. The Contractor's procedure for rehabilitation shall be approved by the ECO and the Engineer and, where required, the Local Authority environmental representative.

7.3 Tolerances

Environmental management is concerned not only with the final results of the Contractor's operations to carry out the Works but also with the control of how those operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete the Works.

It is thus required that the Contractor shall comply with the environmental requirements on an ongoing basis and any failure on his part to do so will entitle the Engineer to certify the imposition of a fine subject to the details set out in the Environmental Specification.

8 OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME

This Specification covers the requirements for controlling the impact on the environment of operational activities.

8.1 Aims and Purpose

This Operational Environmental Management Programme (OEMPR) aims to provide Highlands South WEF RF (Pty) Ltd and their contractors with the necessary tools to ensure that the potential impacts on the environment during the operation of the development are minimised. Moreover, it aims to ensure that the infrastructure is operated and maintained according to Best Practice. The OEMPR aims to ensure that the development is maintained and operated in an environmentally sensitive and sustainable manner, and that the operation of the development does not result in reasonably avoidable environmental impacts.

The OEMPR is a working document that may be amended to enhance its effectiveness for environmental control.

Therefore not all specifications and details are prescribed here but must be discussed and the best possible practicable application made by the responsible parties.

8.2 Application

The application and implementation of the OEMPR shall be the responsibility of Highlands South Wind Energy Facility RF (Pty) Ltd. Highlands South Wind Energy Facility RF (Pty) Ltd is to ensure that relevant requirements of the OEMPR document are implemented, and that the transmission lines are suitably managed. They may appoint a suitably qualified and

experienced person from within the existing staff to fulfil the role of Environmental Site Manager (ESM).

The implementation of the OEMPR, as well as the adherence to any conditions within the Environmental Authorization relating to the operational phase of the development, shall be the responsibility of Highlands South Wind Energy Facility RF (Pty) Ltd.

Should control of the grid connection change from Highlands South Wind Energy Facility RF (Pty) Ltd to Eskom, this OEMPR will remain binding and will supplement Eskom's own standard OEMPR.

8.3 Site Manager

A suitably qualified and trained individual appointed by Highlands South Wind Energy Facility RF (Pty) Ltd or the owner prior to the operation of the grid connection, will fulfil the role of an Environmental Site Manager (ESM). The primary roles and responsibilities of the ESM will be to:

- oversee the implementation of the EMPR on site;
- visit the site on a monthly basis and advise on areas of environmental management, or compliance with the OEMPR, requiring attention;
- visit the site more regularly during the first 3 months of operation, during which more frequent monitoring may be required for the establishment of certain programmes or aspects of environmental management;
- be called to site in the case of any emergency situation which may impact on the local environment;
- liaise with various specialists and the local authorities if required, regarding issues relating to environmental management;
- report on compliance with the OEMPR specifications to the Highlands South Wind Energy Facility RF (Pty) Ltd;
- facilitate environmental audits and ensure that they are undertaken, as required;
- keep a comprehensive record of environmental management, issues of non-compliance for audit purposes; and
- Undertake any other tasks outlined in this document, on the behalf of Highlands South Wind Energy Facility RF (Pty) Ltd.

8.4 Independent Environmental Control Officer

Since provision has been made for the ESM to be an internal Highlands South Wind Energy Facility RF (Pty) Ltd appointment, they must employ an independent Environmental Professional with a post graduate degree in environmental studies and a minimum of five years of relevant experience to act as the independent environmental auditor for the site. The ECO is to be employed upon completion of the first year of operation, and is to perform an annual formal audit on the management plan, and its implementation by the relevant parties for the duration for the operational phase of the project.

8.5 Financing for Environmental Management

The budget for the implementation of the OEMPR shall come out of Highlands Wind Energy Facility RF (Pty) Ltd.'s operational budget. Highlands Wind Energy Facility RF (Pty) Ltd must review the OEMPR and allocate the requisite funds to facilitate compliance. Since many of the items addressed in the OEMPR relate to required preventative maintenance, operator legal compliance, and responsible environmental management, this cost should not represent significant additional expenditure.

8.6 Operational Phase Mitigation Measures

Table 8.1 below presents a summary of the potential impacts as assessed by specialists for the construction phase of the Highlands South Grid Connection.

Table 8.2 below provides the mitigation measures to be implemented for the potential impacts identified.

Table 8.1 Summary of Operational Phase Potential Impacts and Significance Rating for the Preferred Alternative

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Soil degradation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	L	L	H
Wetlands and freshwater							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Impact on localized surface water quality	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Terrestrial Ecological Impacts							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H
Faunal Impacts	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	M
Soil Erosion	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Alien plant invasion	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Avifauna							
Bird mortality from power line collision	L	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Bird mortality from electrocution	L	M	M	Negative	M	M	H
With Mitigation	L	M	M	Negative	L	L	H
Disturbance to birds	M	M	M	Negative	M	M	M

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
With Mitigation	L	M	M	Negative	L	L	M
Bats							
Collision with transmission lines	L	M	L	Negative	L	L	M
With Mitigation	L	M	L	Negative	VERY L	L	M
Social							
Employment and business opportunities	M	M	L	Positive	M	M	H
With Mitigation	M	M	M	Positive	M	H	H
Powerline pylons on the rural landscape	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H
Traffic							
Negligible Impacts	L	L	L	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a

Table 8.2 Operational Phase Mitigations Measures

Mitigation Measure	Responsibility	Frequency
Increase in sedimentation and erosion within the development footprint		
Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities.	ECO to monitor Site engineer/site manager	Weekly
An approved Stormwater Management Plan must be implemented.	ECO to monitor Site engineer/site manager	Weekly
Impact on localized surface water quality		
Strict use and management of all hazardous materials used on site.	ECO to monitor Site engineer/site manager	Weekly
Containment of all contaminated water by means of careful run-off management on the development site.	ECO to monitor Site engineer/site manager	Weekly
Soil degradation		
Implement an effective system of storm water run-off control using bunds and ditches, where it is required - that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	ECO to monitor Site engineer/site manager	Weekly
Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	ECO to monitor Site engineer/site manager	Weekly
Development of infrastructure to generate clean, renewable energy		
Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members.	Developer/ site manager	Throughout operation
Maximise opportunities for local content, procurement and community shareholding.	Developer/ site manager	Throughout operation
Establish a visitor centre. Visitor centers in Scotland have attracted large numbers of visitors to wind farms.	Developer/ site manager	Throughout operation
Creation of employment and business opportunities - Employment		
Where reasonable and practical the proponent must appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.	Developer/ site manager	Throughout operation

Mitigation Measure	Responsibility	Frequency
Where feasible, efforts must be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	Developer/ site manager	Throughout operation
The local authorities, relevant community representatives and local farmers must 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 operational phase of the project.	Developer/ site manager	Throughout operation
The recruitment selection process must seek to promote gender equality and the employment of women wherever possible.	Developer/ site manager	Throughout operation
Where feasible a training and skills development programmes for local workers must be initiated prior to the initiation of the operational phase.	Developer/ site manager	Throughout operation
Creation of employment and business opportunities - Business		
The proponent must liaise with the SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for operational contractors. These companies must be notified of the tender process and invited to bid for project-related work.	Developer/ site manager	Throughout operation
Where possible, the proponent must assist local BBBEE companies to complete and submit the required tender forms and associated information.	Developer/ site manager	Throughout operation
The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, must identify strategies aimed at maximising the potential benefits associated with the project.	Developer/ site manager	Throughout operation
The proponent must implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme must be to maximise the number of South African's and locals employed during the operational phase of the project.	Developer/ site manager	Throughout operation
The proponent, in consultation with the SBDM and BCRLM, must investigate the options for the establishment of a Community Development Trust.	Developer/ site manager	Throughout operation
Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
The SBDM and BCRLM must be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the SBDM and BCRLM that must be consulted include the Municipal Managers Office, IDP Manager and LED Manager	Developer/ site manager	Throughout operation
Clear criteria for identifying and funding community projects and initiatives in the area must be identified. The criteria must be aimed at maximising the benefits for the community as a whole and not individuals within the community	Developer/ site manager	Throughout operation

Mitigation Measure	Responsibility	Frequency
Strict financial management controls, including annual audits, must be instituted to manage the funds generated for the Community Trust from the associated WEF	Developer/ site manager	Throughout operation
Cumulative impact associated with the establishment of a number of renewable energy facilities that has the potential to place pressure on local services, specifically medical, education and accommodation		
The Eastern Cape Provincial Government, in consultation with the SBDM and BCRLM and the proponents involved in the development renewable energy projects in the SBDM and BCRLM area must consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues must be addressed in the Integrated Development Planning process undertaken by the SBDM and BCRLM	Developer/ site manager	Throughout operation
Bird mortality from power line collision		
Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations.	Developer/ site manager ECO to monitor	Weekly
Any mortalities must be reported to the Endangered Wildlife Trust (EWT).	Developer/ site manager	Weekly
Bird mortality from electrocution		
Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures (in line with standard Eskom guidelines), with clearances between live components of 1.8 m or greater and which provides a safe bird perch	Developer/ site manager ECO to monitor	Monthly
All electrical infrastructure, including transformers and substations, must be designed in line with Eskom's standards that ensure adequate insulation of all components to prevent electrocution of birds	Developer/ site manager ECO to monitor	Monthly
Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations. Any mortalities must be reported to the EWT.	Developer/ site manager ECO to monitor	Weekly
Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success		
A site specific Environmental Management Programme (EMPR) must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to reduce unnecessary disturbance. All contractors are to adhere to the EMPR and must apply good environmental practice during all operations	Developer/ site manager ECO to monitor	Weekly

Mitigation Measure	Responsibility	Frequency
No bird nests must be disturbed or removed from any pylon or substation infrastructure prior to consultation with and approval from the avifaunal specialist	Developer/ site manager ECO to monitor	Weekly
The Manager and field staff responsible for maintenance and repairs on the grid connection line (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Grid Connection site, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction	Developer/ site manager ECO to monitor	Weekly
Operational phase bird monitoring, in line with applicable guidelines, must be implemented to include monitoring of the Grid Connection route and must include monitoring of all raptor nest sites for breeding success.	Developer/ site manager ECO to monitor	Weekly

8.7 Eskom Procedures

Eskom requirements for work at or near Eskom infrastructure.

- Eskom's rights and services must be acknowledged and respected at all times.
- Eskom shall at all times retain unobstructed access to and egress from its servitudes.
- No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the owner must give at least seven working days' notice prior to the commencement of work. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager
- Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.
- Under no circumstances shall rubble, earth or other material be dumped within the servitude restriction area. The owner shall maintain the area concerned to Eskom's satisfaction. The owner shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.
- Equipment shall be regarded electrically live and therefore dangerous at all times.
- In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as an additional safety precaution, Eskom will not approve the erection of houses, or structures occupied or frequented by human beings, under the power lines or within the servitude restriction area.
- Eskom may stipulate any additional requirements to highlight any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
- Any third party servitudes encroaching on Eskom servitudes shall be registered against Eskom's title deed at the owner's own cost. If such a servitude is brought into being, its existence must be endorsed on the Eskom servitude deed concerned, while the third party's servitude deed must also include the rights of the affected Eskom servitude.

9 ALIEN INVASIVE MANAGEMENT PLAN

9.1 Purpose of the Alien Invasive Management Plan

The purpose of the Alien Invasive Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Wind Energy Facility. The broad objectives of the plan includes the following:

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

9.2 Problem Outline

Alien plants replace indigenous vegetation leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, loss of grazing resources, increased fire risk, increased erosion, loss of wetland function, impacts on drainage lines, increased water use etc.

In addition, the Conservation of Agricultural Resources Act (Act 43 of 1983), as amended in 2001, requires that land users clear *Declared Weeds* from their properties and prevent the spread of *Declared Invader Plants* on their properties.

Table 3 of CARA (the Conservation of Agricultural Resources Act) lists all declared weeds and invader plants. Alien plants are divided into 3 categories based on their risk as an invader.

- Category 1 - These plants must be removed and controlled by all land users. They may no longer be planted or propagated and all trade in these species is prohibited.
- Category 2 – These plants pose a threat to the environment but nevertheless have commercial value. These species are only allowed to occur in demarcated areas and a land user must obtain a water use licence as these plants consume large quantities of water.
- Category 3 – These plants have the potential of becoming invasive but are considered to have ornamental value. Existing plants do not have to be removed but no new plantings may occur and the plants may not be sold.

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

9.3 Vulnerable Ecosystems and Habitats

Certain habitats and environments are more vulnerable to alien plant invasion and are likely to bear the brunt of alien plant invasion problems at the site. In addition, construction activities and changes in water distribution at the site following construction are also likely to increase and alter the vulnerability of the site to alien plant invasion.

Areas at the site which are likely to require specific attention include the following:

- Wetlands, drainage lines and other mesic areas
- Cleared and disturbed areas such as road verges, crane pads and construction footprints etc.
- Construction camps and lay-down areas which are cleared or are active for an extended period.

9.3.1 Wetlands, Drainage Lines and Other Mesic Areas

There are a relatively large number of drainage lines at the site as well as a number of artificial wetlands. Disturbance within these areas often results in alien plant invasion on account of the greater water and nutrient availability in this habitat. Although there are no turbines within such areas, numerous road crossings will be required. The disturbance footprint within such areas must be minimized and these areas must be checked for alien species more than the surrounding landscape.

9.3.2 Cleared and Disturbed Areas

Cleared and disturbed areas are clearly vulnerable to invasion on account of the lack of existing plant cover to resist invasion as well as the disturbance created during construction which promoted the germination and establishment of alien plant species.

9.3.3 Construction Camps and Laydown Areas

Construction camps and lay down areas are either cleared of vegetation or prolonged activities in these areas result in negative impact on indigenous vegetation. In addition, repeated vehicle and human activity in these areas usually results in the import of alien plant seed on clothes, dirty vehicles or with construction machinery and materials.

9.4 General Clearing and Guidance Principles

- Alien control programs are long-term management projects and must include a clearing plan which includes follow up actions for rehabilitation of the cleared area. Alien problems at the site must be identified during pre-construction surveys of the development footprint. This may occur simultaneously to other required reaches and surveys. The clearing plan should then form part of the pre-construction reporting requirements for the site.
- The plan must include a map showing the alien density & indicating dominant alien species in each area.
- Lighter infested areas must be cleared first to prevent the build-up of seed banks.
- Pre-existing dense mature stands ideally must be left for last, as they probably won't increase in density or pose a greater threat than they are currently.
- Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses.
- All clearing actions must be monitored and documented to keep track of which areas are due for follow-up clearing.

9.4.1 Clearing Methods

- Different species require different clearing methods such as manual, chemical or biological methods or a combination of both.
- However care must be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil must be kept to a minimum. Fire is not a natural phenomenon in the area and fire must not be used for alien control or vegetation management at the site.
- The best-practice clearing method for each species identified must be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. http://www.dwaf.gov.za/wfw/Control/

9.4.2 Use of Herbicide for Alien Control

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

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment must be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles must be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures must also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines must be followed:

Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.

9.5 Alien Plant Management Plan

9.5.1 Construction Phase Activities

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Construction Phase Action	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	Daily
Clearing of vegetation must be undertaken as the work front progresses – mass clearing must not occur unless the cleared areas are to be surfaced or prepared immediately afterwards.	Weekly
Where cleared areas will be exposed for some time, these areas must be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides must not be used.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose must be brought onto site. Brush from cleared areas must be used as much as possible. The use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation is not allowed within 32 m of any wetland, 80 m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowed construction activities in these areas	Weekly
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiles must be checked regularly and any weeds emerging from material stockpiles must be removed.	Weekly
Alien vegetation regrowth on areas disturbed by construction must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines must adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Monthly
Clearing activities must be contained within the affected zones and may not spill over into demarcated No Go areas.	Daily
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only	Monthly
Wetlands and other sensitive areas must remain demarcated with appropriate fencing or hazard tape. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.	Daily

9.5.2 Monitoring Actions - Construction Phase

The following monitoring actions must be implemented during the construction phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Pre-construction

Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

9.5.3 Operational Phase Activities

The following management actions are aimed at reducing the abundance of alien species within the site and maintaining non-invaded areas clear of aliens.

Operational Phase Action	**Frequency**
Surveys for alien species must be conducted regularly. Every 6 months for the first two years after construction and annually thereafter. All aliens identified must be cleared.	Every 6 months for 2 years and annually thereafter
Where areas of natural vegetation have been disturbed by construction activities, revegetation with indigenous, locally occurring species must take place where the natural vegetation is slow to recover or where repeated invasion has taken place following disturbance.	Biannually, but revegetation must take place at the start of the rainy season
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, must be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	When necessary
No alien species must be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species must be used.	When necessary

9.5.4 Monitoring Actions - Operational Phase

The following monitoring actions must be implemented during the construction phase of the development.

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

9.5.5 Decommissioning Phase Activities

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.

Decommissioning Phase Action	**Frequency**

All damaged areas shall be rehabilitated if the infrastructure is removed and the facility is decommissioned	Once off
All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	Once off, with annual follow up re-vegetation where required
Maintain alien plant monitoring and removal programme for 3 years after rehabilitation.	Biannually

9.5.6 Monitoring Actions - Decommissioning Phase

The following monitoring and evaluation actions must take place during the decommissioning phase of the development

Monitoring Action	Indicator	Timeframe
Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually until such time as the natural vegetation has recovered sufficiently to resist invasion.
Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually for 3 years
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Annually for 3 years

10 PLANT RESCUE AND PROTECTION PLAN

10.1 Purpose

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures to reduce the impact of the development on listed and protected plant species and their habitats. Although this report identifies those species suitable for search and rescue at the site, it is important to note that a preconstruction walk-through of the site would also be important to refine the list of species identified for search and rescue, as well as locate such species prior to construction.

The objective of reusing plants on the project area is to prevent the loss of species either directly or through future extinction and minimising impacts of development on population dynamics of species of conservation concern.

Preserving the natural configuration of habitats as part of ecosystems, thus ensuring a diverse but stable hydrology, substrate and general environment for species to be able to become established and persist.

10.2 Effect of Removing Individual Species of Conservation Concern

Species of conservation concern are declining either due to overexploitation or because their range of occupancy is limited and further infringed on by development. Most plant populations require a certain minimum number of individuals within a population or metapopulation to allow for sufficient genetic transfer between individuals. This prevents

genetic erosion and hence weakening of the ability of individuals to persist in their environments. Similarly, where the distance between metapopulations is significantly increased due to fragmentation and the resultant loss of some populations, populations may suffer genetic decline due to restricted movement of pollen. Pollinators or other species that depend on a particular plant species for a specific microhabitat or food source may be equally affected because of the reduction of available resources. Therefore the aim of plant rescue actions are always to maintain as many individuals of a plant population in as close proximity to the original habitat as possible to minimise loss of individuals and fragmentation of populations to prevent the creation of future extinction debts of the development.

10.3 Plant Rescue and Protection

Successful plant rescue can only be achieved if:

- Species can be removed from their original habitat with minimal damage to the plant, especially the roots.
- All plants removed are safely stored and treated according to their specific requirements prior to being transplanted again.
- They are relocated into a suitable habitat and protected from further damage and all disturbances to aid their re-establishment.
- Timing of planting activities is planned with the onset of the growing season.
- Steps are taken where necessary to aid the initial establishment of vegetation, including occasional watering.

10.4 Time of Planting

- All planting shall be carried out as far as is practicable during the period most likely to produce beneficial results (i.e. during the peak growing season), but as soon as possible after completion of a section of earthworks.
- Drainage line rehabilitation preparation must be done during autumn, and planting of appropriate species in these areas must commence during early spring after the first rains.

10.5 Plant Search and Rescue

Prior to construction, once all the areas where topsoil will be removed or areas will be transformed have been demarcated, the ECO and contractor will be responsible to remove all bulbous species from the topsoil, as well as succulents and small indigenous shrubs that can be transplanted. These are to be kept in a raised, protected position in a designated area until they can be replanted again as part of the rehabilitation process. Further details are listed in the Re-vegetation and Habitat rehabilitation Plan.

11 RE-VEGETATION AND HABITAT REHABILITATION PLAN

The Revegetation and Habitat Rehabilitation Plan addresses the need to mitigate all impacts leading to disturbed vegetation, loss of species and/or agricultural potential, disturbed soil surfaces, and generally bare soils prone to erosion and further degradation on the proposed development site. The plan overlaps to some degree with the Erosion Management Plan, and for successful rehabilitation, it is imperative that this plan is at all times used in conjunction with other EMPRs mentioned.

The objective of the plan is therefore to provide:

- Protocols for the removal, temporary storage and replanting of plant species of conservation concern Protocols for the rehabilitation of vegetative cover across the project area.

- Tools for planning the rehabilitation work and responding to unforeseen events Guidelines on implementation and post-implementation tasks Criteria for evaluating rehabilitation success.
- A summary of items to be included in the rehabilitation budget to ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPR-related activities is consistent with the significance of project impacts.

The objective of rehabilitation and revegetation of the development area is:

- Preventing the loss of species either directly or through future extinction and minimising impacts of development on population dynamics of species of conservation concern.
- Preserving the natural configuration of habitats as part of ecosystems, thus ensuring a diverse but stable hydrology, substrate and general environment for species to be able to become established and persist.
- Preserving or re-creating the structural integrity of natural plant communities. Actively aid the improvement of indigenous biodiversity according to a desirable end state according to a previously recorded reference state. This reference state, if healthy, will be dynamic and able to recover after occasional disturbances without returning to a degraded state.
- Improving the ecosystem function of natural landscapes and their associated vegetation.
- Successful rehabilitation can only be achieved with: »A long-term commitment »Practical, adaptive management »Viable goals of desired outcomes

Prior to vegetation rehabilitation, all stakeholders involved must be consulted to determine:

- What the rehabilitation is ultimately aiming for– rehabilitation of cropping/grazing lands or rehabilitation of indigenous vegetation, after soil erosion and storm water management is in place and IAPs have been cleared?
- A clear definition of incompatible and compatible vegetation on and in the immediate surroundings of the development must be defined and maintained as such. No tree or shrubs shall be allowed to grow to a height in excess of the horizontal distance of that tree or shrub from the nearest newly developed structure or to grow in such a manner as to endanger the development or its operation
- Who will take long-term ownership and hence responsibility for the rehabilitation and its subsequent monitoring and management? Continued monitoring of vegetation establishment and composition, as well as erosion detection will have to be coupled with continued follow-up maintenance of rehabilitation and erosion control from commencement of activity up to the decommissioning phase.
- The ultimate objective for rehabilitation must focus on the stabilisation of soil erosion, retaining agricultural potential of transformed areas and /or the establishment of a dense and protective plant cover and the maintenance of habitats to enable vegetation to persist and flourish on rehabilitated areas indefinitely, ultimately relying only on environmental resources.

11.1 Map and Create Management Areas

The entire project area must be mapped and divided into management areas indicating:

- Current land cover
  - Roads and residential
  - Areas with IAPs, subdivided further in sparse or dense infestations where applicable
  - Transformed areas
  - Untransformed indigenous vegetation

For every one of the management areas, the project proponent, in consultation with the land users, will have to decide what intervention will be necessary, desirable, and feasible to enable the development of the project and long-term sustainable maintenance of infrastructure. Thus for every management area there must be an operational outline on:

- what will happen there
- what needs to be mitigated – including storm water- and erosion management
- which management units need priority intervention/mitigation
- how will this mitigation / intervention be done (method statements) including schedule of work
- realistic and desirable end states including list of species that should be established to initiate rehabilitation after initial revegetation
- approximate timeframes
- monitoring protocol to evaluate success or failures of interventions
    - establish permanently marked transects and monitor with fixed-point photography who will be responsible for doing what how will different actions be integrated to achieve and maintain or improve the desirable end state of the environment of that management unit

Special attention will have to be given to drainage zones, as these not only have very active morph dynamics, but are also distributers of seeds – both indigenous and of IAPs. Thus clearing a downstream invasion of aliens to enable maintenance of the development will be futile if the upstream IAPs are not cleared or at least aggressively controlled.

11.2 Setting Realistic Rehabilitation Goals

Rehabilitation efforts typically aim at improving ecosystem function that consists of a series of processes, which can in the end be evaluated against a desired outcome or reference state of the vegetation and environment.

Attainable goals of rehabilitation on the project area must be possible and viable for at least the following:

- Stabilisation of soils
- Stabilisation of riparian areas
- Storm water reduction through management and wetland integrity
- Clearing of IAPs
    - The degree to which IAPs can be cleared from the project area needs to be determined according to desirability, available project funding, personnel and project requirements
- Restoring and/or rehabilitating vegetative cover on non-transformed areas to obtain an acceptable vegetation cover that can be maintained or persists on its own indefinitely.

11.3 Remove or Ameliorate the Cause of Degradation

This will include:

- Physical rehabilitation of topsoil where it has been removed.
- Topsoil on areas that have not been cultivated are considered as the upper 20 - 30 cm only. These contain the most important nutrients, micro flora and –fauna essential for nutrient cycling processes. Topsoils are also an important source of seeds.
- Subsoils and overburden substrata lack the above elements and will first have to be used for physical rehabilitation of landscapes as and where necessary, and then overlain with topsoils

- Stabilisation of topsoils and prevention of erosion – refer to the Erosion management pan
- Removal of all invasive vegetation – refer to the Alien Invasive Management Plan
    - Where it is desirable to use brush or logs of the cleared vegetation for soil stabilisation, such material must be free of regenerative material – e.g. seeds or root suckers

11.4 Initial Revegetation

Immediately after clearing of vegetation, the soil surface must be inspected for signs of erosion and stabilised as soon as possible. After completion of construction, such erosion stabilisation must preferably be with a cover of vegetation. A dense initial grass or other perennial cover will be desirable. The appropriate seed mix must be determined in consultation with an ecologist familiar with the area. The aim of the first vegetation cover is to form a protective, relatively dense indigenous layer to slow runoff, increase moisture infiltration into the soil, and gradually change the soil nutrient status in order for it to be more favourable for other desirable indigenous vegetation to become established.

11.4.1 Natural seed banks and improvement of plant structural and compositional diversity

It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover, but may not be sufficient to establish an acceptable cover of desirable species. After deciding which indigenous species must be re-introduced, seed must be ideally collected from site or an environmentally-matched site nearby.

Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. Seeds must be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.

Alternatively, slower-growing perennials may be raised from seed or cuttings in a nursery and then transplanted once established. It will be beneficial to investigate if community members would be able to create and maintain such a nursery, or if there are nurseries in the area, that raise indigenous flora from the area.

The final vegetation cover must resemble the original (non-encroached) vegetation composition and structure as far as practicable possible or permissible within each management unit.

For drainage areas:

- First restore drainage line morphology following the guidelines of the Erosion Management Plan – without that ecological recovery cannot be initiated
- Determine if natural seed sources may be present further upstream
- If such upstream seed sources are still present, rehabilitation of riparian vegetation after soil erosion management will most likely occur naturally, PROVIDED that follow-up monitoring of the establishment of vegetation is carried out, and all invasive species eradicated as they emerge. This can only be achieved with a long-term commitment (> 5 years minimum)
- Should no upstream seed resources be available, suitable species (as determined in consultation with an ecologist) must be sown or planted.

11.5 Monitoring and follow-up action

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of ecosystems affected by the development, and remedy these as soon as detected.

During the construction phase, the ECO and contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the project proponent will have to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state
- Associated nature and stability of surface soils
    - It is recommended that permanent transects are marked and surveyed annually according to the LFA technique (Tongway and Hindley 2004), adapted to integrate both surface soil characteristics and the vegetation to be monitored
- Re-emergence of IAPs
    - If noted, remedial action must be taken immediately according to Working for Water specifications
- Nature and dynamics of riparian zones
    - Stability of riparian vegetation
    - Any form of bank erosion, slumping or undercutting
    - Stability of channel form and width of streams – if this increases, it shows that vegetation on plains and/or riparian areas and upper drainage lines are not yet in a stable enough state to be fully functional in reducing excess runoff and the ecosystem overall is losing valuable resources

11.6 Timeframes and duration

- Rehabilitation will occur during construction, as areas for the re-application of topsoil and revegetation become available or where revegetation can be initiated after clearing of invasives or to stabilise erosion.
- The initial revegetation period post construction is estimated to be over a period of 6 (minimum) to 12 months (maximum), or a time period specified by the Horticultural Landscape Contractor, particularly if planting of trees and shrubs occurs.
- The rehabilitation phase (including post seeding maintenance) must be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).
- If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until at acceptable plant cover is achieved (excluding alien plant species or weeds).
- Additional seeding or planting may be necessary to achieve acceptable plant cover. Hydro seeding may have to be considered as an option in this case.
- Any plants that die, during the maintenance period, shall be replaced by the Horticultural Landscape Contractor (at the Horticultural Landscape Contractor's cost if it was due to insufficient maintenance).
- Succession of natural plant species must be encouraged

- Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging invasives shall be carried on until the decommissioning phase has been completed.

12 OPEN SPACE MANAGEMENT PLAN

The objective of open space management is to restore, enhance and rehabilitate open spaces, improve climate change adaptations through the minimisation of biodiversity loss, and mitigate against environmental degradation. Management actions consider open spaces and natural areas as well as community perceptions of these.

In the context of the proposed grid connections and substations the primary purpose of the open plan management plan is therefore to:

- Minimise visual impact on the character of the area; and
- Maintain biodiversity within the area to ensure that no long-term negative impacts occur on the local environment.

The proposed grid connection connections and associated infrastructure have the potential to impact negatively on the character of the area, as identified in the Visual Impact Assessment conducted during the impact assessment phase. The following actions must be implemented to minimise this visual impact:

- Grid connection route to avoid visually sensitive peaks, major ridgelines, scarp edges and slopes steeper than 1:5 gradient
- Substation to be sited in unobtrusive low-lying areas, away from roads and habitations, and screened by berms and/or tree-planting where feasible.
- Operations and maintenance buildings and parking areas to be located in an unobtrusive area and consolidated to avoid sprawl of buildings in the open landscape.
- Access roads to be in sympathy with the contours, avoid steep 1:5 slopes and drainage courses, and kept as narrow as possible.
- Access and haul roads to use existing farm tracks as far as possible.
- Construction camp, stockpiles and lay-down area to be located out of sight of district roads, possibly in the vicinity of the proposed substation and O&M buildings.
- Disturbed areas rather than pristine or intact land to preferably be used for the construction camp. Construction camp and laydown areas to be limited in area to only that which is essential.
- Measures to control wastes and litter to be included in the contract specification documents.
- Provision to be made for rehabilitation/ re-vegetation of areas damaged by construction activities.

In order to maintain biodiversity the Alien Invasive, Plant Rescue and Protection and Re-vegetation and Habitat Management Plans must be adhered to.

In addition the following actions must implemented by the Contractor and Project Company:

- Promote environmental awareness in all employees and sub-contractors and create an understanding of the environmental sensitivities of the project site;
- No waste, including organic matter may be disposed of anywhere on site, except in provided bins placed at convenient locations, especially during the construction period. Disciplinary actions must be taken against littering.
- Open spaces are to be kept free of alien plants and weeds;
- Indigenous plants may not be collected or removed from the site;
- Access to the facility must be strictly controlled
- All visitors and contractors must be required to sign-in

- Signage at the entrance must indicate that disturbance to fauna and flora is strictly prohibited

The following activities should not be permitted by anyone except the landowner or his representatives:

- No fires within the site
- No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission.
- No driving off of demarcated roads
- No interfering with livestock

12.1 Grazing Management

The development of the wind energy facility will not prevent the site from being used for its current land-use of livestock production. Extensive livestock grazing is compatible with biodiversity maintenance provided that it is implemented according to the basic principles of sustainable grazing management. While the majority of these are beyond the scope of the current plan, the following basic principles must be adhered to:

- A grazing management plan for the site should be developed in cooperation with Agricultural Extension services.
- The stocking rate applied must be within the recommended limits as identified by the Department of Agriculture.
- Livestock must be rotated through the different paddocks at the site in a manner which allows for the growth and recovery of the vegetation between grazing events.
- Precautions must be taken to ensure that the development of the site does not increase the risk of stock theft within the facility. These include access control as previously described, as well as security patrols.

13 TRAFFIC MANAGEMENT PLAN

The objective of the traffic management plan is the prevention of incidents from the use of vehicles and disturbance of local traffic on public roads during the construction, operation and decommissioning phases of the proposed projects. Traffic volumes are most likely to increase during the construction phase. However, due to the remote location of the site, and the low volume of traffic on public roads in the area the impact is expected to be low.

Actions to be implemented by the Contractor and Project Company:

- Site-specific traffic plan to be developed and implemented during the detailed design phase prior to construction;
- Limit use of private cars by arranging mini bus transport service for workers;
- Monitor for overloading of vehicles;
- Use only well trained, suitably qualified and experienced drivers in possession of an appropriate and valid driver's license;
- All vehicles must be roadworthy and serviced regularly;
- Clear and visible signage must be placed on and around site, clearly demarcating safe entry and exit points;
- Require all drivers to abide by standard road and safety procedures on site;
- When travelling on public roads all speed limits and rules of the road must be adhered to; and
- Limit dust generation by applying dust suppressants and postponing dust generating activities during period of strong winds and enforcing a strict speed limit of 40 km/h on unpaved roads.

Monitoring actions to be conducted by the ECO

- Maintain incidents/complaints register for community complaints;
- Monitor dust generation and implementation of management actions detailed above.

14 TRANSPORTATION MANAGEMENT PLAN

The Transportation Management Plan aims to ensure the safe transportation of all components required for the construction of the proposed projects to the construction site. This includes the substation transformers, electrical cables and pylon structures.

The following actions must be implemented by the Project Company and Contractor:

- Apply for all relevant permits for abnormal loads and route clearances with the relevant authorities prior to construction;
- Appoint a qualified specialist to conduct a detailed site-specific Transport Risk Assessment during the detailed design phase and prior to construction;
- Determine the pre-construction condition of the road immediately prior to construction by carrying out a condition assessment or from recent pavement management system condition assessments if available from the Provincial Authorities;
- Public notices regarding any planned abnormal load transports must be placed at the construction site to inform affected parties;
- Abnormal loads must conform with legal maximum dimensions, and vehicles carrying abnormal loads must display sufficient signage;
- Any roads damaged during the transportation of components, or from other construction vehicles must be rehabilitated and returned to pre-construction conditions.

The following monitoring activities must be carried out by the ECO:

- Conduct site audits and report non-compliance with the above-mentioned conditions.

15 STORM WATER MANAGEMENT PLAN

The objective of the storm water management plan (SWMP) is to prevent increased soil erosion, to contain any contaminated run-off and to avoid water logging and pollution. The Erosion Management Plan (see below) must therefore be seen in conjunction with the SWMP. Actions are listed that will ensure that storm water is channelled in a controlled manner from roads and substations towards natural drainage lines, without impeded natural surface flows.

- Develop and implement a site-specific storm water management plan during the detailed design phase of the projects and prior to construction;
- In the detailed design phase of the project minimise any water crossings and utilise existing roads wherever possible;
- Enforce 32 m construction buffers of all rivers, streams and waterbodies;
- Should new roads be required to cross any banks or channels these must be secured with erosion protection (i.e. gabions etc.);
- Monitor for erosion during the clearing of vegetation;
- Avoid hard-engineered surfaces (i.e. construct gravel roads and not asphalt roads wherever possible);
- Roads in steep areas must be equipped with side drainages and culverts that channel the run-off to natural drainage lines without gaining velocity and causing erosion;
- Construction camps and temporary ablution facilities must be located beyond the 1:100 year floodline;
- Stockpiles must be located on flat areas and protected from erosion;
- The substation site design must include side water outlets and an adequate slope to allow storm water run-off from the paved areas;
- Prevent surface run-off from areas of potential contamination.

16 EROSION MANAGEMENT PLAN

16.1 Purpose

The purpose of the erosion management plan is to implement avoidance and mitigation measures to reduce the erosion potential and the likely impact of erosion associated with the construction and operational phases of the proposed facility. As part of the management plan, measures to protect hydrological features from erosion damage are included.

16.2 Scope and Limitations

This plan is intended at introducing measures aimed at reducing the negative impacts of erosion on biodiversity as well as reducing the vulnerability of the site to erosion problems during the construction and operational phases of the development. The focus is on managing runoff and reducing the construction phase impact on ecologically sensitive areas. The plan does not cover engineering-side issues which are of relevance to soil management and erosion. Therefore issues such as the potential presence of heaving clays, compressible soils, perched water tables, dispersive soils and corrosive groundwater at the site are beyond the general scope of this study and are not directly dealt with. These issues would need to be addressed and their relevance assessed during detailed geotechnical investigation of the site.

16.3 Background

16.3.1 Types of Erosion

Erosion comes in several forms, some of which are not immediately obvious. The major types of erosion are briefly described below:

Raindrop impact

This is the erosion that occurs due to the "bomb blast" effect of raindrop impact. Soil particles can be blasted more than a meter into the air. Apart from loosening soil particles, the effect can also break soil aggregates apart and form a clay seal on the surface which resists infiltration and results in increased levels of runoff. This effect is most important when large areas of exposed soils are present. If the site is cleared, then this effect will play an important role as it results in the soil surface becoming sealed which reduces infiltration and increases runoff, leading to erosion.

Sheet Erosion

This is the removal of a shallow and uniform layer of soil from the surface. It is caused initially by raindrop splash and then by runoff. Sheet erosion is often difficult to see as no perceptible channels are formed. Accumulated sediment at the bottom of the slope is often the only indicator. This is likely to be an important erosion type at the site given the gently sloping nature of the site and the susceptible soils.

Rill Erosion

This is the removal of soil from the surface whereby small channels or rills up to 300 mm are formed. It is caused by runoff concentrating into depressions, wheel tracks etc.

Gully Erosion

This is the removal of soil from the surface and sub-surface caused by concentrated runoff eroding channels greater than 300mm deep. Gully erosion often begins as rill erosion.

Wind Erosion

Wind erosion results from soil particles being picked up, bounced or moved by the wind. Wind erosion is primarily a problem in arid areas and may affect sands soils as well as fine-textured soils. Vegetation cover is usually an effective barrier to wind erosion, but large soils losses or degradation can occur in disturbed areas or on croplands.

16.3.2 Promoting Factors

Rainfall characteristics

High-intensity, short-duration storm events have much greater erosion potential than low intensity, longer duration storm events with the same runoff volume. Intense storms produce larger raindrops, and are more likely to break up the soil and dislodge particles.

Soil erodibility

Soil erodibility is determined by the soils ability to resist detachment and transport due to rainfall, runoff and infiltration capacity. Well-structured soils with a high clay content are generally least erodible. Some clays are dispersible meaning that they break down when wet and become highly erodible. Silts and fine sands are highly erodible.

Length and Steepness of Slope

Steeper slopes cause runoff velocities to increase, resulting in increased erosion. As the slope length increases the opportunity for runoff to concentrate and achieve an erosive velocity increases.

Soil Surface Cover

Soil surface cover such as vegetation and mulch protect the soil surface from raindrop impact, reduce flow velocity, disperse flow, and promote infiltration and the deposition of sediment. This is a basic principle underlying many erosion control approaches which aim to modify the surface characteristics in order to reduce the flow velocity and reduce the potential for erosion. In this regard it is important to note that many of the practices which are used to enhance rehabilitation potential are also useful in reducing erosion potential.

16.4 Erosion and Sediment Control Principles

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

- Protect the land surface from erosion;
- Intercept and safely direct run-on water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment.
- Progressively revegetate or stabilise disturbed areas.
- Prevent damage to hydrological features such as drainage lines or wetlands, either within or adjacent to the site.

These goals can be achieved by applying the following principles:

1. Integrate project design with site constraints.
2. Plan and integrate erosion and sediment control with construction activities.
3. Minimise the extent and duration of disturbance.
4. Control stormwater flows onto, through and from the site in stable drainage structures.
5. Use erosion controls to prevent on-site damage.

6. Use sediment controls to prevent off-site damage.
7. Control erosion and sediment at the source.
8. Stabilise disturbed areas promptly.
9. Inspect and maintain control measures.

16.5 On-Site Erosion Management

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, the erosion management plan and the revegetation and rehabilitation plan must be closely linked to one another and must not operate independently, but must rather be seen as complementary activities within the broader environmental management of the site and must therefore be managed together.

General factors to consider regarding erosion risk at the site includes the following:

- Soil loss will be greater during wet periods than dry periods. Intense rainfall events outside of the wet season, such as occasional unseasonal showers can also however cause significant soil loss. Therefore precautions to prevent erosion must be present throughout the year.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilization. Therefore the gap between construction activities and rehabilitation must be minimized. Allied to this the fact that topsoil does not store well and must preferably be used within a month or at most within 3 months to aid in the revegetation and rehabilitation of disturbed areas.
- Phased construction and progressive rehabilitation are important elements of the erosion control strategy.
- The extent of disturbance will influence the risk and consequences of erosion. Therefore large areas must not be cleared at a time, especially in areas such as slopes where the risk of erosion is higher.

16.5.1 Concentration of flows into downstream areas

Road crossings over drainage lines, streams and wetlands can impact downstream wetland ecosystems. Crossings that result in narrowing of the downstream system can result in concentration of flows and channelisation downstream. This may result in a loss of wetland function, and result in the drying out and shrinkage of the wetland area. Erosion and increased vulnerability to invasion of drier banks by alien vegetation may occur.

- Culverts must be adequately spaced such that they do not result in shrinkage of downstream wetlands. Where roads cross minor drainage channels, a single culvert may be adequate, aligned with the downstream drainage line. Where more substantial wetland systems are intercepted by a road, sufficient culverts must be provided such that downstream shrinkage of wetland width does not occur. Moreover, culverts should be aligned, as far impossible, with existing, natural channels.
- All crossings of drainage systems must ensure that both surface and shallow subsurface flows can be accommodated where appropriate and that unnatural channelisation does not occur downstream.

16.5.2 Runoff Concentration

The increase in hardened surfaces associated with roads, and other infrastructure will lead to a significant increase in volume and velocity of flow generated from these areas during large rainfall events.

Runoff from road surfaces is usually channelled off of the road surface towards the downslope side of the road. On steep slopes, the volumes and velocity of runoff generated

may result in erosion of the surrounding areas. Therefore specific measures to curb the speed of runoff water is usually required in such areas, such as rock beds or even gabions. In addition, these areas must be monitored for at least a year after construction to ensure that erosion is not being initiated in the receiving areas. Once erosion on steep slopes has been initiated, it can be very difficult to arrest.

16.5.3Diversion of Flows

Diversion of flows from natural drainage channels may occur when roads interrupt natural drainage lines, and water is forced to run in channels along the manipulated road edge to formalized crossing points. Even slight diversion from the natural drainage line can result in excessive downstream erosion, as the new channel cuts across the slope to reach the valley bottom. Should the access road to the site traverse any major drainage lines, the following principles must apply:

- Adequate culverts must be provided along the length of all roads to prevent diversion of flow from natural drainage lines.
- Culverts must be carefully located, such that outlet areas do in fact align with drainage lines.
- The downstream velocity of runoff must d be managed, such that it does not result in downstream erosion – on steep slopes, where roads have been constructed on cut areas, allowance must be made for culverts to daylight sufficiently far down the slope that their velocities are managed and erosion does not occur.
- Where necessary, anti-erosion structures must be installed downstream of road drains – these may comprise appropriate planting, simple riprap or more formal gabion or other structures.
- Roads and their drainage system must be subject to regular monitoring and inspection, particularly during the wet season, so that areas where head cut erosion is observed can be addressed at an early stage.

16.5.4Monitoring Requirements

16.5.4.1 Construction Phase

The following monitoring actions must be implemented during the construction phase of the development

Monitoring Action	Indicator	Timeframe
Identify all river and drainage line crossings affected by the development	Map of sites of potential concern	Preconstruction
Monitor cleared areas for erosion problems	Record of monitoring site, problems encountered and remedial actions implemented	Monthly during the rainy season and following significant rainfall events otherwise
Monitor vegetation clearing activities near sensitive areas such as wetlands or drainage lines	Activity log of monitoring actions and any mitigation and avoidance measures implemented	Monthly during the rainy season and following significant rainfall events otherwise
Monitor revegetated and stabilised areas	Record of monitoring site, problems encountered and remedial actions implemented	Monthly during the rainy season and following significant rainfall events otherwise

16.5.4.2 Operational Phase

The following monitoring actions must be implemented during the operational phase of the development:

Monitoring Action	Indicator	Timeframe
Monitor for the development of new erosion problems across the site, with a focus on areas where water has been diverted or collected from upslope onto downslope areas	Map of erosion problem areas	Quarterly
Document erosion control measures implemented	Records of control measures and their success rate.	Quarterly
Document the extent of erosion at the site and the remedial actions implemented	Decline in erosion and vulnerable bare areas over time	Biannually

17 FIRE MANAGEMENT PLAN

The National Veld and Forest Fires Act states that it is the landowner's responsibility to ensure that the appropriate equipment as well as trained personnel are available to combat fires.

Although fires are not a regular occurrence at the site, fires may occasionally occur under the right circumstances. Ignition risk sources in the area include the following:

- Lightning strikes
- The railway line which runs through the facility
- Personnel within the facility
- Infrastructure such as transmission lines

17.1 Firebreaks

Extensive firebreaks are not recommended as a fire risk management strategy at the site. The site is very large compared to the extent of the infrastructure and the maintenance of firebreaks would impose a large management burden on the operation of the facility. In addition, the risk of fires is not distributed equally across the site and within many of the lowlands of the site, there is not sufficient biomass to carry fires and the risk of fires within these areas is very low. Rather targeted risk management must be implemented around vulnerable or sensitive elements of the facility such as substations or other high risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used as this in itself poses a risk of runaway fires. Where such firebreaks need to be built such as around substations, a strip of vegetation 5 10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However if alien species colonise these areas, more regular clearing must be implemented.

18 FUEL STORAGE MEASURES

18.1 Storage Tanks

The storage tanks will be within contained areas to prevent spills contaminating soil and water, and with a design to capture and contain a volume of spill of at least 110% of the volume of stored fuel. These containers can be built in concrete and painted with anti-

corrosive paint. The floor of the container must be inclined to permit the collection of the spilled liquids.

The storage tanks must also have a cover protection on top, prepared for drainage and collection of runoff.

18.2 GENERAL PROCEDURES

- Transport routes for the transport of fuel will be clearly indicated;
- Pollution control equipment (spill and leak cleaning kits) must be readily available;
- Ensure personnel training, including: measures to prevent fuel spills, to treat/clean fuel spills, how to react on spill of flammable liquids on clothing and in the inhalation of vapours, leaks simulations; fuel vapour recovery processes, etc. Keep records of all training;
- Maintain the premises and equipment in a clean and tidy state;
- Regularly clean outdoor areas with a broom;
- Wastewater from outside areas must be directed to the contaminated water drainage system, and not enter the storm water system;
- Used oils (waste oil) will be collected, re-used, stored and disposed of in line with disposal procedures for hazardous wastes;
- Ensure the proper management of other hazardous wastes (contaminated soils, used spilling kits, waste lube, etc.).

18.3 Filling Operations

- Isolate the area by cones and a rope;
- Prohibit refuelling operations during tank filling operations;
- Avoiding having people who are not involved in the operation within a 10 metre radius;
- Prohibit smoking and the use of mobile telephones or any other ignition sources during tank filling operations or vehicle refuelling, within a 3 metre radius;
- Use a tight-fill cap to completely seal off the connections between the tubing and the truck's and station's tanks;
- Engines must be turned off during refuelling;
- Prevent overflowing and spilling situations when the storage tanks are being filled (verify filling sensors and be aware of overflow alarms).

18.4 Preventing Accidents with fuel mixtures

- Establish a procedure to deal with the potential occurrence of these situations, such as:
- The chemicals and reaction mechanisms associated with the substances mixed or blended must be well understood and documented
- Chemical and process hazards must be understood and addressed and the facilities must ensure that process equipment, controls, and procedures are designed, installed and maintained to safely operate the process
- All employees must understand the chemical and process hazards
- Facilities must establish a system for Standard Operating Procedures and ensure that they are understood and followed
- Display clear and informative messages for users of the station, as to how to deal with this situation;
- Prepare a procedure to suitably dispose of wastes recovered from the batches of fuel mixture.

18.4.1Spill Kits

- Emergency spill kits of absorbent material (e.g. sand) must be provided and stored next to the higher risk sites, and must be easily-accessible, ideally outside, in order to allow an immediate response when a spill occurs. This will be clearly labelled and ready for use.
- Drums for the storage of contaminated material must be provided.
- An accurate drawing of the local drainage system shall be posted next to the spill kit.

18.5 Closure Phase

- During the closure phase, there may be loss of product into the soil, as a result of a deliberate or accidental release during closure and removal of tanks and tubing. In addition, this risk may arise outside of the facility site, if the tanks and/or tubing are not properly disposed of.
- In the closure phase, it is important to remove all tanks and pipes. A risk may arise if the tanks are left on site with residual products. As the integrity of the equipment will no longer be ensured or monitored.
- During closure, it must be ensured that facilities do not present a risk to the environment, health or safety. Measures must be taken to ensure that the closure does not result in an unacceptable risk, including:
  - Any and all waste products will be removed from the tanks. Care will be taken to ensure that no product is lost into the soil. Tank closure must be carried out safely, with the removal of explosive vapours, for example by filling the tanks with water or inert gases. All tanks will be safe prior to their removal from the ground. Similar methods will be employed prior to the removal of the pipes.
  - Water used in this process will be contaminated with residual product, and thus a water contamination risk may arise if the contaminated water is not disposed of in a way which is appropriate for hydrocarbon contamination. This would normally imply the removal to a suitable waste handling facility.
  - According to best environmental practices, the tanks, tubing and distributors will be disposed of. However, if the tanks remain in situ, it will be ensured that the procedure is safe. After making the tanks inert and safe, they will be filled in with sand, concrete, inert mud or hydrophobic foam.
  - The tanks and associated tubing which are no longer considered appropriate or safe for fuel storage will not be used for storage of other hydrocarbons, without first ensuring their integrity.
  - The oil/water separators will be removed for disposal, off the facility site. Otherwise they will be filled in a similar way to the tanks. Regardless of the fate of the oil/water separator, all liquid and mud waste will be removed (off the facility site) and all the inlets and outlets will be sealed.
  - Whatever drainage system left behind will be modified to ensure that it does not serve as a path for pollutants to reach groundwater or other waters.
  - If the deactivation is temporary, product can be left in the tanks. In this case, all monitoring procedures will be carried out as if the facility were in operation. If for any reason the monitoring cannot carry on, the tanks will be emptied and made inert.
  - Personnel involved in the closure of a filling and fuel station will be aware and respect obligations with regards to waste disposal, in line with the best practices described above.

Environmental Aspect	Action or Measure
Prevent accidental spills from entering the stormwater drainage system	Provide cleaning equipment conceived specifically to deal with minor spills as may occur at the station. Place a clearly-identified spill kit in a visible location for each fuelling line.
	Develop a step-by-step guide to use of the spill kit.
	Develop an evacuation plan and/or response procedures for emergencies involving large fuel spills.
	Train the whole team in the emergency response procedures. Make sure that all staff knows where the emergency equipment is to be found and is acquainted with its maintenance.
	Label all of the stormwater drains on site in the proximity of the facilities as "Clean Water Only".
	Inspect the fuel distribution area in order to confirm that rainwater drained or emptied from the roof doesn't enter the areas marked out.
	Check whether the embankment around the fuel distribution area is in good condition and has the capacity to contain a fuel leak in the event of an emergency.
Minimise the risks of environmental contamination and from issues of workers' health and safety	Provide training to the staff regarding the disposal of material contaminated with fuel, such as absorbent material from the spill kit, soaked in fuel.
	Ensure that the product safety cards for all fuels and oils are up-to-date and accessible at all times.
Minimise the risks of fuel leaks as may result in pollution of the sub-soil and groundwater	Check if there is fuel, from a possible leak, in the spill containment sumps installed at the tank's discharge nozzle.
	Check if there is fuel, from a possible leak, in the all tanks containment sumps, installed on the manhole to the storage tanks. In the event of suspected leakage, report it immediately.
	Check if there is fuel or lube, from a possible leak in the containment sumps installed under the tanks.
Minimise the risks of fuel leaks as this may result in pollution of the sub-soil and groundwater	Check if there is fuel, from a possible leak, in the chambers of the containment sumps installed under the pumps
Minimise the risks of harmful emissions to the atmosphere and the loss of fuel	Check that lids, flanges and connections are closed.
	Confirm that the ventilation conduits are not blocked.
	Supervise the fuel deliveries.
Minimise the risks of water pollution	Carry out an Oil-Water Separator inspection to ensure effective treatment.
Integrity control	Adequate maintenance and calibration of the monitoring equipment

19 AVIFAUNA MONITORING AND MANAGEMENT PLAN

19.1 Construction Phase Bird Monitoring Programme

Construction phase bird monitoring must be conducted in line with the current best practise guidelines[3] and applicable species specific guidelines (i.e. Verreaux's Eagle guidelines[4]). Construction phase bird monitoring must be conducted throughout the entire construction phase of the Grid Connection. For the purposes of compiling this programme it assumed that the length of the construction phase will be 12 months, and hence this programme is based on a 12 month period. The length (and scope) of the programme must be revised once the construction schedule has been finalised, and any additional pre-construction bird monitoring has been completed. An Environmental Control Officer (ECO) must oversee activities and ensure that the site specific EMPR is implemented and enforced.

19.1.1 General Construction Phase Mitigation Requirements

- Existing roads and farm tracks must be used where possible;
- The minimum footprint areas of infrastructure must be used wherever possible, including access road widths and lengths;
- A site specific Environmental Management Programme (EMPR) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat.
- Environmental Control Officer (ECO) to oversee activities and ensure that the site specific environmental management programme (EMPR) is implemented and enforced;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken;
- Construction of grid infrastructure (within the WEF site) must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- The Grid Connection route must, where possible, follow existing linear infrastructure such as roads and power lines, and must be constructed as close as practically possible to the existing infrastructure;
- Where the new power line is adjacent to an existing line, ensure that new pylons are staggered so that they are not in line with existing pylons wherever possible;
- Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures (in line with standard Eskom guidelines), with clearances between live components of 1.8 m or greater and which provides a safe bird perch;
- All electrical infrastructure, including transformers and substations, must be designed in line with Eskom's standards that ensure adequate insulation of all components to prevent electrocution of birds; and
- Any clearing of large trees (>5m in height), especially stands of large alien trees (e.g. Blue Gum or Pine) on site must be approved first by an avifaunal specialist. Before, clearing, the location and description of the trees must be provided to the specialist, who may request the ECO to inspect the trees for any nests prior to clearing.

19.1.2 Avifaunal Walkthrough

- Prior to construction, the avifaunal specialist must conduct a site walkthrough, covering the final power line route to identify any nests/breeding/roosting activity of sensitive species as well as any additional sensitive habitats, as well as spans requiring Bird Flight Diverters (BFDs to increase visibility). It is likely that the specialist may recommend all,

[3] Birds and Wind-Energy Best-Practice Guidelines. Third Edition, 2015 (Jenkins et al. 2015).

[4] Verreauxs' Eagle and Wind Farms-Guidelines for impact assessment, monitoring and mitigation. BirdLife SA, 2017.

or the vast majority of spans will need to be mitigated and suitable financial allowance must be made for this;
- Install bird flight diverters as per the instructions of the specialist following the site walkthrough, which may include the need for modified BFDs fitted with solar powered LED lights on certain spans;
- The results of the walkthrough may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise; and
- Following the walkthrough, sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be avoided.

19.1.3Reporting

- An avifaunal specialist must confirm the reporting requirements, but these must be in line with guideline requirements and reports must be submitted to relevant stakeholders in line with applicable guidelines.

19.2 Proposed Operational Phase Bird Monitoring Programme

19.2.1General

The operational monitoring of the Grid Connection power lines must be incorporated into the operational monitoring programme of the WEF. This monitoring must be done in line with the latest bests practise guidelines applicable at the time of monitoring commencing. Reports must be generated as part of operational monitoring programme and must be submitted to Birdlife SA, Endangered Wildlife Trust (EWT), Department of Environmental Affairs (DEA) and the relevant provincial environmental department/authority.

19.2.2Live Bird Monitoring

- The Manager and field staff responsible for maintenance and repairs on the grid connection line (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species.
- If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Grid Connection site, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction;
- All raptor nest sites must be monitored for breeding success; and
- No bird nests must be disturbed or removed from any pylon or substation infrastructure prior to consultation with and approval from the avifaunal specialist.

19.2.3Carcass Searches

- Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations.
- Any mortalities must be reported timeously to the Endangered Wildlife Trust (EWT).

19.2.4Programme Revision

The above programme is based on current best practise and knowledge. At the time of commencement of the Grid operations, this programme must be reviewed by a bird specialist for relevance, and updated if/where required.

20 DECOMMISSIONING PHASE

Should the transmission line be decommissioned a decommissioning plan must be produced. The plan must include details on the decommissioning and dismantling of the lines, taking in consideration the potential environmental impact associated with it. Environmental monitoring plans must be produced so ensure no pollution occurs during this phase. The plan must include the steps that will be taken to rehabilitate the area after the lines are dismantled, as well as recycling options of the equipment and structures.

21 CONCLUSION

In terms of the National Environmental Management Act 107 of 1998 everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner.

Furthermore, in terms of the 'Act', the cost to repair any environmental damage shall be borne by the person responsible for the damage.

It is therefore imperative that the management plan is successfully implemented, as a failure to comply could have legal implications.

The environmental impacts on the site will not be significant if the construction management is well implemented, and a set of operational guidelines are developed by the long term site management body.