SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

Proposed Development of the 132kV Portion/Yard of the 33kV/132kV portion of the shared on site substation and associated 132kV Power line for the Patatskloof Wind Energy Facility (WEF), near Ceres in the Witzenberg Local Municipality, Cape Winelands District in the Western Cape Province

Draft Basic Assessment Report (DBAR)

Issue Date:	5 December 2022
Revision no.:	2.0
Project No.	16168
DFFE Ref No.:	To be allocated

Date:	5 December 2022
Document Title:	Proposed Development of the 132kV Portion/ Yard of the 33kV/132KV portion of the shared on site substation and associated 132kV Power line for the Patatskloof Wind Energy Facility (WEF), near Ceres in the Witzenberg Local Municipality, Cape Winelands District in the Western Cape Province: Draft Basic Assessment Report (DBAR)
Revision Number:	2.0
Author:	*Rendani Rasivhetshele* *EAPASA Reg No. 2019/1729*Brettj
Checked by:	Natalie Pullen *EAPASA Reg No. 2018/138*
Approved by:	Natalie Pullen *EAPASA Reg No. 2018/138*
Signature:	
Client:	South Africa Mainstream Renewable Power Developments (Pty) Ltd

Confidentiality Statement

KEY PROJECT INFORMATION

TECHNICAL DETAILS:

Component	Description / Dimensions
Generation Capacity of Substation	33/132kV
Location	The proposed WEF and associated grid infrastructure is located approximately 25km north-east of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality.
Affected Properties	FARM PLATFONTEIN NO 240 PORTION 1 OF THE FARM TOOVERBERG NO 244 REMAINDER OF THE FARM TOOVERBERG NO 244 FARM LOWER STINKFONTEIN NO 245 REMAINDER OF THE FARM UPPER STINKFONTEIN NO 246 PORTION 1 OF THE FARM DRINKWATERS KLOOF NO 251 REMAINDER OF THE FARM DRINKWATERS KLOOF NO 251 REMAINDER OF SILVERCROW 252 REMAINDER OF FYNBOSLAND 250
SG Codes	• C01900000000024000000 • C01900000000024400001 • C01900000000024400000 • C01900000000024500000 • C01900000000024600001 • C01900000000025100001 • C01900000000025100000 • C01900000000025200000
Area occupied by Substation	Up to approximately 15.5 hectares
Height of Substation	Height of substation will be confirmed during the final design stages of the substation, prior to construction commencing
Transformer Information	▪ Will be a shared substation which will contain transformers for voltage step-up from medium voltage to high voltage. ▪ Direct Current (DC) power from PV modules will be converted into Alternating Current (AC) power in inverters and voltage will be stepped up to medium voltage in inverter transformers
Site Access	Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It should be noted that the proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 WCG provincial Roads
Grid Connection Information	▪ One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF

Component	Description / Dimensions
	and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and ▪ One (1) new 132kV overhead power line connecting the on-site substation to either Kappa or Adamskraal Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

The coordinates for the grid connection and associated substations are as follows:

PATATSKLOOF GRID CONNECTION				
CENTRE LINE COORDINATES (DD MM SS.sss)				
	START POINT	MIDDLE POINT	END POINT	APPROX LENGTH (KM)
OPTION 1 (from Substation 1)	S33° 5'41.41"	S33° 5'29.65"	S33° 6'36.07"	12.50 km
	E20° 7'21.27"	E20° 4'16.19"	E20° 0'48.56"	
OPTION 1 (from Substation 2)	S33° 7'8.56"	S33° 4'59.71"	S33° 6'36.07"	15.85 km
	E20° 7'49.78"	E20° 5'37.07"	E20° 0'48.56"	
OPTION 2 (from Substation 1)	S33° 5'41.41"	S33° 8'56.71"	S33° 6'36.57"	23.81 km
	E20° 7'21.27"	E20° 5'7.72"	E20° 0'45.15"	
OPTION 2 (from Substation 2)	S33° 7'8.56"	S33° 8'55.29"	S33° 6'36.63"	21.25 km
	E20° 7'49.78"	E20° 4'52.16"	E20° 0'45.08"	
OPTION 3 (from Substation 1 to Adamskraal Substation)	S33° 5'41.00"	S33° 4'39.75"	S33° 4'46.97"	4.48 km
	E20° 7'21.64"	E20° 6'46.98"	E20° 5'36.55"	

OPTION 3 (from Substation 2 to Adamskraal Substation)	S33° 7'8.56"	S33° 5'27.83"	S33° 4'46.97"	7.86 km
	E20° 7'49.78"	E20° 7'21.66"	E20° 5'36.55"	
OPTION 4 (from Substation 1)	S33° 5'33.26"	S33° 9'26.43"	S33° 6'36.57"	25.05 km
	E20° 7'21.09"	E20° 4'43.05"	E20° 0'45.15"	
OPTION 4 (from Substation 2)	S33° 7'8.56"	S33° 9'26.31"	S33° 6'36.57"	22.46 km
	E20° 7'49.78"	E20° 4'6.74"	E20° 0'45.15"	
OPTION 5 (from Substation 1)	S33° 5'33.26"	S33° 8'24.91"	S33° 6'36.57"	23.39 km
	E20° 7'20.50"	E20° 3'25.40"	E20° 0'45.15"	
OPTION 5 (from Substation 2)	S33° 7'8.56"	33° 8'11.58"	S33° 6'36.57"	22.44 km
	E20° 7'49.78"	20° 3'32.10"	E20° 0'45.15"	
OPTION 6 (from Substation 1 to Adamskraal Substation)	S33° 5'40.77"	S33° 4'50.31"	S33° 4'46.97"	4.49 km
	E20° 7'21.24"	E20° 6'51.76"	E20° 5'36.55"	
OPTION 6 (from Substation 2 to Adamskraal Substation)	S33° 7'8.56"	S33° 5'34.66"	S33° 4'46.97"	7.91 km
	E20° 7'49.78"	E20° 7'20.34"	E20° 5'36.55"	

PATATSKLOOF GRID CONNECTION		
SUBSTATION, BESS, CONSTRUCTION LAYDOWN, O&M BUILDINGS SITE COORDINATES		
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
SITE ALTERNATIVE	**SOUTH**	**EAST**
OPTION 1	S33° 5'41.80"	E20° 7'31.04"
OPTION 2	S33° 7'10.50"	E20° 7'52.89"

The final design details of the proposed substation will become available during the detailed design phase of the proposed development, before construction commences.

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

PATATSKLOOF GRID INFRASTRUCTURE

DRAFT BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

INTRODUCTION AND PROJECT DESCRIPTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream') is proposing to develop one (1) new 33/132kV on-site substation as well as one (1) new associated 132kV overhead power line for the proposed Patatskloof Wind Energy Facility (WEF) (part of a separate Basic Assessment (BA) process / application: **DFFE Reference Number: To be allocated**), located near the town of Ceres in the Witzenberg Local Municipality, Cape Winelands District Municipality, Western Cape Province of South Africa (hereafter referred to as the 'proposed development')

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental processes for the proposed construction of the Patatskloof On-site Switching / Collector Substation and associated 132kV Power Line. The proposed development requires an EA from the National Department Forestry, Fisheries and the Environment (DFFE). The Basic Assessment (BA) process for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, the proposed overhead power line and 33/132kV on-site switching substation / collector substation would be subject to a BA process in terms of the NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 (as amended). The provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning - WC DEA&DP) as well as CapeNature will also be consulted.

The proposed grid connection infrastructure is located within the Electricity Grid Corridor (EGI) as published in terms of Section 24(5) (a) and (b) of the NEMA in GN R113 of 16 February 2018. Accordingly, a BA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed grid project.

The overall objective of the proposed development is to feed the electricity generated by the proposed Patatskloof WEF into the national grid.

This report forms part of one (1) of two (2) grid connection infrastructure developments (namely on-site substations and overhead power lines) that are being proposed on nearby properties by Mainstream. In addition, two (2) WEF developments are also being proposed on adjacent properties by Mainstream. The other proposed developments (i.e. WEF, substation and power line) which are being proposed on nearby properties include the following:

- Patatskloof WEF – **DFFE Reference Number:** To be allocated (part of a separate BA process / application); and
- Karee WEF – **DFFE Reference Number:** To be allocated (part of a separate BA process / application);
- Karee WEF Substation and Power Line – **DFFE Reference Number:** To be Allocated (part of separate BA process / application).

At this stage it is anticipated that the proposed grid connection infrastructure to serve the Patatskloof WEF (part of separate application) will include the following components:

- One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site substation to Adamskraal Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

Although the WEF (part of separate application) and associated grid connection infrastructure (part of this application) will be assessed separately, a single public participation process is being undertaken to consider all of the proposed developments [i.e. two (2) WEF EIAs and two (2) grid connection infrastructure BAs]. The potential environmental impacts associated with the proposed development have been assessed as part of the cumulative impact assessment.

APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED IN 2017)

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended
11 (i)	**GN R. 327 (as amended) Item 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.
12 (ii) (a) (c)	**GN R. 327 (as amended) Item 12:** The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.
19	**GN R. 327 (as amended) Item 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;

24 (ii)	**GN R. 327 (as amended) Item 24:** The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.
27 (i)	**GN R. 327 (as amended) Item 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.
28 (ii)	**GN R. 327 (as amended) Item 28:** Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;
56 (ii)	**GN R. 327 Item 56:** The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - (ii) where no reserve exists, where the existing road is wider than 8 metres –
Activity No(s):	Provide the relevant **Scoping and EIA Activity(ies**) as set out in **Listing Notice 2** of the EIA Regulations, 2014 as amended
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3** of the EIA Regulations, 2014 as amended
4 i. (ii) (aa)	**GN R. 324 (as amended) Item 4:** The development of a road wider than 4 metres with a reserve less than 13,5 metres. **i. Western Cape** ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;
12 i. ii.	**GN R. 324 (as amended) Item 12:** The clearance of an area of 300 square metres or more of indigenous vegetation **i. Western Cape** ii. Within critical biodiversity areas identified in bioregional plans;
14 (ii) (a) (c); i. i. (ff)	**GN R. 324 (as amended) Item 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 watercourse, measured from the edge of a watercourse; **i. Western Cape** i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or inbioregional plans;
18 i. ii. (aa)	**GN R. 324 (as amended) Item 18:** The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer- **i. Western Cape** ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation

DETAILS OF ALTERNATIVES CONSIDERED

Two (2) locations of the proposed 33/132kv shared on-site substation are considered. The on-site substation will be a step-up substation and will include an Independent Power Producer (IPP) portion (33kv portion/yard of the shared 33/132kv onsite substation) and an Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation – this portion will be ceded to Eskom once the onsite substation is constructed and the necessary transfer of rights undertaken), hence the IPP portion (33kv portion/yard of the shared 33/132kv onsite substation) has been included in the WEF BA process (i.e. a separate application) and the Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation) and associated 132kv overhead line, included in the grid connection infrastructure BA process (this application). This will facilitate an ease of transfer over to Eskom once the onsite substation is constructed.

Six (6) power line corridor route alignments are being considered and have been comparatively assessed by the EAP and specialists within a 150m wide assessment corridor (75m on either side of power line) as follows:

1. **Power Line Corridor Option 1** is approximately 16km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
2. **Power Line Corridor Option 2** is approximately 24km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
3. **Power Line Corridor Option 3** is approximately 8km in length, linking either Substation Option 1 or Substation Option 2 to Adamskraal Substation.
4. **Power Line Corridor Option 4** is approximately 25km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
5. **Power Line Corridor Option 5** is approximately 24km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation. It should be noted that the assessment corridor applied to a short section of this route alignment serving Substation Option 2 has been widened to 300m.
6. **Power Line Corridor Option 6** is approximately 8km in length, linking either Substation Option 1 or Substation Option 2 to Adamskraal Substation.

PUBLIC PARTICIPATION PROCESS TO BE UNDERTAKEN FOR THE EIA PHASE

Notification of BA process to be undertaken as follows:

- Issuing of the notifications and initial landowner consultation (to be circulated to all I&APs in December 2022 respectively as part of the Draft Basic Assessment Report (proof to be included in Final Basic Assessment Report).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **02 December 2022** (proof included in the Basic Assessment Report).
- Notification letters to be sent via E-mail or sms (if cell phone number / email is available, it is assuming the I&AP have an email or cell phone).
- Public notification of the BA process was advertised along with the WEF project, in a local newspaper (**namely Die Courier** on **02 December 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof to be included in the Draft Basic Assessment Report.

Availability of report for review:

- Report available on SiVESTs website for download.
- Electronic copies can be made available to parties via a secure digital link that will be emailed upon request for the documentation.
- CDs / Flash drive to be posted, only if requested.
- The Draft Basic Assessment Report will be located and available for review at the following locations:
    - John Steyn Public library, 33 Owen Street (opposite post office and shopping centre), Ceres, Western Cape, South Africa.

POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED PATATSKLOOF WEF

Impact	Pre-mitigation	Post-mitigation
PLANNING		
Impacts to Biophysical Systems		
Aquatic / Freshwater – None Identified		
Terrestrial Ecology – None Identified		
Agricultural – Compliance Statement		
Bat – None Identified		
Impacts to Socio-Economic Component		
Social		
Corruption	Medium	Medium
Heritage		
Construction activities close to these resources can damage and cause irreparable damage or destroy the resource. Rock art sites are extremely sensitive to human actions and are easily damaged.	High	Medium
Destruction or damage to previously unidentified archaeological or historical resources	High	Low
Heritage (Cultural Landscape)		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	High	Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Very High	Medium
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Very High	Low
Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	Very High	Low
Noise – None Identified		
Visual – None Identified		
CONSTRUCTION		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	Medium	Low
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while	Medium	Low

Impact	Pre-mitigation	Post-mitigation
works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system		
Terrestrial Ecology		
The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	Medium	Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural - Compliance Statement		
Avifauna		
Construction: Displacement due to disturbance	Medium	Low
Construction: Displacement due to habitat transformation	Low	Low
Bat		
The destruction of features that could serve as potential roosts, such as rock formations and the removal of trees on site. The destruction of derelict holes, such as aardvark holes, and and fragmentation of woody habitat which include relative dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in and or the foraging habitat of clutter and clutter-edge species.	Medium	Low
Geotechnical		
Ground disturbance during access road construction, foundation earthworks, platform earthworks.	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Medium	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Medium	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Impacts to Socio-Economic Component		
Social		
Availability of community services	Low	Low
Cultural and historic resources	Medium	Medium
Social and community infrastructure	Low	Low
Annoyance, dust and noise	Low	Low
Crime and security	Medium	Low
Daily living patterns	Low	Low
Employment and business opportunities	Low	Low
Farming operations	Low	Low
Fire hazard	Low	Low
Hazard exposure	Low	Low

Impact	Pre-mitigation	Post-mitigation
STDs, HIV and AIDS	Low	Low
Risk to livestock	Medium	Medium
Temporary influx of construction workers	Low	Low
Informal development and settlements	Low	Low
Transport		
Increase in Traffic	Medium	Low
Increase of Incidents with pedestrians and livestock	Medium	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low
Heritage (Cultural Landscapes)		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	High	Low
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	High	Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Very High	Low
Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	Very High	Low
Heritage (Palaeontology)		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Low	Low
Visual		
Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Low	Low
OPERATIONAL		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	Medium	Low
Terrestrial Ecology		
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural – Compliance Statement		
Avifauna		
Mortality of priority species due to collisions with the 132kV OHL	Medium	Low
Geotechnical		
Soil Erosion (Option 1)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion	Low	Low

Impact	Pre-mitigation	Post-mitigation
(Option 2)- Increased erosion due to alteration of natural drainage		
Soil Erosion (Option 3)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 4)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 5)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 6)- Increased erosion due to alteration of natural drainage	Low	Low
Social		
Vulnerability of small enterprises	Low	Low
Land use	Low	Low
Livelihoods and ecosystem services	Low	Low
Employment after construction	Low	Low
Transformation of the sense of place	Medium	Medium
Security of electricity supply	High	n/a
Heritage (Cultural Landscapes)		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	High	Medium
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	High	Medium
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Transport		
Increase in Traffic	Low	Low
Increase of Incidents with pedestrians and livestock	Low	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
New / Larger Access points	Low	Low
Noise		
Visual		
The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	Low	Low
DECOMMISSIONING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	Medium	Low
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes,	Medium	Low

Impact	Pre-mitigation	Post-mitigation
cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system		
Terrestrial Ecology		
The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed.	Low	Low
The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	Medium	Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural - Compliance Statement		
Avifauna		
Displacement due to disturbance associated with the dismantling of the grid connection.	Low	Low
Geotech		
Disturbance/ displacement/ removal of soil and Rock (Option 1)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 1)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 2)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 2)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 3)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 3)- increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 4)- Ground disturbance during platform earthworks,road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 4)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 5)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 5)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 6)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 6)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low

Impact	Pre-mitigation	Post-mitigation
Impacts to Socio-Economic Component		
Social – None Identified		
Heritage (Cultural Landscape)		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	High	Low
Grid infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	High	Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Very High	Low
Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	Very High	Low
Transport		
Increase in Traffic	Medium	Low
Increase of Incidents with pedestrians and livestock	Medium	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low
Noise		
Visual		
Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. Decommissioning activities may be perceived as an unwelcome visual intrusion. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Low	Low
CUMULATIVE		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	Low	Low
Terrestrial Ecology		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	Low	Low
Agricultural - Compliance Statement		
Avifauna		
(1) Displacement of priority species due to habitat destruction in the substation footprint (2) Displacement of priority species due to disturbance associated with the construction activities. (3) Mortality of priority species due to collisions with the 132kV OHL. (4) Displacement of priority species due to disturbance associated with the decommissioning activities.	Medium	Medium
Bat – None Identified		

Impact	Pre-mitigation	Post-mitigation
Impacts to Socio-Economic Component		
Social		
Vulnerability of small enterprises	Medium	n/a
Availability of community services	Medium	n/a
Cultural and historic resources	Medium	n/a
Land use	Medium	n/a
Livelihoods and ecosystem services	Low	n/a
Social and community infrastructure	Low	n/a
Annoyance, dust and noise	Medium	n/a
Blade glint	Medium	n/a
Crime and security	Medium	n/a
Daily living patterns	Low	n/a
Electromagnetic field (EMFs)	Low	n/a
Employment after construction	Medium	n/a
Employment and business opportunities	Medium	n/a
Farming operations	Medium	n/a
Fire hazard	Medium	n/a
Hazard exposure	Medium	n/a
Shadow flicker	Medium	n/a
STDs, HIV and AIDS	High	n/a
Risk to livestock	Medium	n/a
Transformation of the sense of place	Medium	n/a
Corruption	Medium	n/a
Security of electricity supply	Medium	n/a
Temporary influx of construction workers	High	n/a
Informal development and settlements	Medium	n/a
	Medium	n/a
Heritage		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Medium	Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Low	Medium
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Very High	Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Heritage (Palaeontology)		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Low	Low
Heritage (Cultural Landscapes)		
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Very High	Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Transport		
Increase in Traffic	Medium	Medium
Increase of Incidents with pedestrians and livestock	Medium	Medium
Increase in Dust from gravel roads	Medium	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Medium	Low

Impact	Pre-mitigation	Post-mitigation
Increase in Dust from gravel roads	Medium	Low
New / Larger Access points	Low	Low
Visual		
Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	Medium	Medium

SPECIALIST STUDIES

The following specialist studies have been undertaken for the project:

- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Bat Impact Assessment
- Biodiversity Impact Assessment
- Heritage Impact Assessment
    - Paleontological Impact Assessment
    - Archaeological Assessment
    - Cultural Landscape Assessment
- Geotechnical Assessment (desktop)
- Noise Impact Assessment
- Social Impact Assessment (desktop)
- Surface Water Impact Assessment
- Transportation Impact Assessment
- Visual Impact Assessment

A summary of the main findings of the specialists are included below:

Specialist Study	Findings	Recommendations
Agricultural	The site has very low agricultural potential predominantly because of climate constraints. As a result of the constraints, the site is totally unsuitable for cultivation, and agricultural land use is limited to grazing. The land is predominantly of low agricultural sensitivity, but includes some areas of medium sensitivity. The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the	The recommended mitigation measures are implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.

Specialist Study	Findings	Recommendations
	agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of very limited land capability and is not suitable for the production of cultivated crops, the amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol, the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits, and that the proposed development poses a low risk in terms of causing soil degradation.	
Avifaunal	It is estimated that a total of 135 bird species could potentially occur in the broader area of the proposed Patatskloof Wind Energy Facility. Of these, 38 are classified as sensitive species for powerlines. The proposed Patatskloof grid connection will have several potential impacts on priority avifauna. These impacts are the following: • Displacement of priority species due to disturbance linked to construction activities in the construction phase. • Displacement due to habitat transformation in the construction phase. • Collisions with the overhead line in the operational phase. • Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase.	The proposed Patatskloof WEF grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The mitigation measures in the report must be strictly adhered to.
Biodiversity	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment as indicated in the Screening Tool Results	The specialist noted that infrastructure would have to cross some sensitive areas in particular access roads, cables and overhead lines. Therefore, any mitigations around route selections mentioned in the report must be considered (e.g., use

Specialist Study	Findings	Recommendations
	(CBA, ESA & NFEPA). The information collected, was also compared to previous assessments within the region by members of EnviroSci, used in the assessment of the wind farms that have been completed. In summary three key terrestrial habitats were observed and mapped and then rated based on their sensitivity to the proposed development, with a fourth habitat associated more with the aquatic environment. These habitats included: 1. *Ruschia* quartzites (within in study area but no development take place in these areas) *2.* Tanqua karoo - *Pteronia pallens / Zygophyllum shrubland* *3.* Renosterveld & Fynbos *4.* Tanqua Wash Riviere Several High Sensitivity Habitats were thus observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated.	existing tracks) and must be considered in the walkdown surveys post authorisation.
Aquatic	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment. Three key aquatic habitats were observed and mapped and then rated based on their sensitivity to the proposed development. These habitats included:	The specialist noted that infrastructure would have to cross some sensitive areas in particular access roads, cables and overhead lines. Therefore, any mitigations around route selections mentioned in the report must be considered (e.g., use existing tracks) and must be considered in the walkdown surveys post authorisation.

Specialist Study	Findings	Recommendations
	1. Alluvial Wash floodplains (two sub types) 2. Watercourses with or without riparian vegetation 3. Minor watercourses Several High Sensitivity Habitats were observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated after and inspection is conducted by the specialist once the localities have been finalised. However, it is recommended that Grid Options 1 and 6, should be considered further to minimize the extent of access needed when compared to the other 4 grid options.	
Geotechnical	The assessment area is underlain by rock units of Dwyka Group ad Ecca Group of the Karoo Supergroup and locally by faulted rock units of the Cape Supergroup. Some geotechnical constraints have been identified, primarily shallow bedrock which may cause excavation difficulties, thick alluvium and steep slopes. These constraints may be mitigated via standard engineering design and construction measures. Spread footings are considered suitable to support the structures on majority of the site.	Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in the report.
Heritage – Archaeological	A total of 47 sites were identified, consisting of twenty-four (24) Historical Structures (kraals, houses, stonewalling and labourer houses), twenty-one (21) archaeological sites, and two (2) burial ground and graves, that may be affected by the proposed project. A background	This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. An assessment of the final footprint of the new Patatskloof grid connection infrastructure must be

Specialist Study	Findings	Recommendations
	scatter of stone tools (flakes, cores and blades) was observed throughout the project area. As such only sites with a density of 5 or more tools were recorded as sites. Thirteen of the sites were observed to be in proximity of the grid alignment options. The sites are PK 17, 18, 19, 20, 22, 24, 41, 46, 47, 16, 15, 14, 07.	conducted with the final walkdown of the area during the implementation of the EMPr. The following mitigation measures will be required: • An archaeological walk down of the final approved layout will be required before construction commences; • Implement a 50-meter buffer around all structures with a rating of IIIC and higher. • Implement a 500-meter buffer around the farmstead site at **PK 15**. • Implement a 200-meter buffer around the rock art sites at **PK 46**. • Demarcate the resources rated as IIIB-IIIA no-go areas. • A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. • A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.
Heritage – Cultural	The area proposed for development is located within an undulating Ceres Karoo landscape within which the predominant land use is game grazing. It is a semi-arid region and the vegetation is characteristic of the Succulent Karoo Biome. The area is covered in varying densities of knee high scrub, with tombstone weathered rock outcrops on the elevated areas of the site. Evidence of historic stock management is evident in the various stone kraals located on the site, often on the slopes of the small koppies. An absence of tall trees is noteworthy, with such landscape elements usually associated to cultural activity. The low vegetation accentuates the topography	The following heritage indicators and development buffers apply to the grid connection: • Landscape units D and E are suitable for sensitive WEF infrastructure development; • A 500m buffer to either side of the district road for turbine and infrastructure placement (Patatskloof WEF does not propose turbines or infrastructure within this buffer); • 300m buffer to either side of identified significant historic farm roads (pink) for turbine placement, substation and laydown areas;

Specialist Study	Findings	Recommendations
	of the landscape, especially areas of elevation such as the Toverberg and Pramberg, which have been used as orientating elements for game and travellers over the landscape through time. There is a farmhouse with some historic elements, as well as a few other historic and modern structures at various stages of use, and numerous farm tracks intersecting the large farm property but the site remains predominantly natural and very isolated. Natural ephemeral streams (currently dry) have cut through the landscape in shallow ravines, with some areas of shallow drainage having allowed for crop cultivation in the past. Various examples of water management through damming and wind pumps are evident on the landscape. Vehicles can be seen traversing the landscape from a distance due to the flat topography and the moving dust columns they create. More recent introductions of the Perdekraal WEFs, the Kappa Substation and other associated electrical grid infrastructure can be found in the general region and directly to the north of the Patatskraal site, which detract from the historic and natural wilderness character of the general region. The Ceres Karoo region is a significant cultural landscape that reflects the relationship between man and nature over a period of time. This relationship has generally been sustainable, where biodiversity and ecological systems have been maintained in the utilisation of the landscape expressed in specific land use patterns. The surrounding land use indicates a social appreciation of the natural environment with low impact stock and game farming with limited farmstead crop cultivation. The vastness and relative homogenous nature of the cultural landscape is, however, often undervalued. If careful contextual planning is not followed, it will rapidly result in a cluttered	• The historic route (yellow) that passes through Stinkfontein site is no longer in use as such, but should be reinstated as a walking trail and open to public access. • 50m outer boundary buffer for roads and infrastructure around farmsteads including cultivated areas and graves – integrity of farmstead complex as a whole should be retained; • 200m freestanding graded heritage structure buffer for new roads and infrastructure; • 100m buffer from cemetery or unmarked burial for all development; • 400m buffer around water management bio-cultural landscape elements (blue circles); • 600m buffer around significant Stinkfontein site (orange circle); • existing roads to be used with minimal upgrade as far as possible; • riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archeological) whichever is further (buffers not indicated). • CBA and ESA no-go areas for all development, unless otherwise recommended by the biodiversity and environmental specialist studies for this site; • Pienaarspoort gateway buffer included in the 300m farm road buffer and unit A. Further, the following change to the current proposed layout is recommended by the specialist: • The substation option 1 and Gridline alternative 3 should be located out of the CBA, without impacting on the riverine corridor flood line and slopes over 3%.

Specialist Study	Findings	Recommendations
	wasteland. This does not mean that development is discouraged, but rather that the implementation of wind and solar energy farms should be planned holistically.	
Heritage – Paleontological	The Patatskloof WEF, BESS and grid connection project areas are underlain by several basinal to shallow marine sedimentary formations of the Witteberg Group (Cape Supergroup), Dwyka Group and Ecca Group (Karoo Supergroup) of Palaeozoic age. All these units are potentially fossiliferous but only two – the Early Carboniferous Waaipoort Formation and the Early Permian Whitehill Formation – are generally regarded as of high palaeosensitivty due to their record of well-preserved fish, mesosaurid reptiles, crustaceans and plant fossils in the Tanqua - Ceres Karoo region and elsewhere. The overall impact significance of the construction phase of the proposed Patatskloof WEF and grid connection regarding legally-protected palaeontological heritage resources is assessed as LOW (negative status), with and without mitigation. This assessment applies equally to all layout alternatives and grid connection options under consideration. There is therefore no preference on palaeontological heritage grounds for any specific layout (e.g. location of on-site substation, construction laydown area, grid connection corridor) among those under consideration. No significant further impacts on fossil heritage are anticipated during the operational and decommissioning phases of the renewable energy developments. The No-Go alternative (i.e. no WEF / grid development) would probably have a neutral impact on palaeontological heritage.	No palaeontological High Sensitivity or No-Go areas have been identified within the grid connection project areas. None of the recorded fossil sites lies within the development footprint as currently defined. Pending the potential discovery of significant new fossil material here during the construction phase, no specialist palaeontological monitoring or mitigation is recommended for these developments. Recommended mitigation comprises: (1) The Environmental Site Officer (ESO) should be made aware of the possibility of important fossil remains (bones, teeth, fish, petrified wood, plant-rich horizons *etc*) being found or unearthed during the construction phase of the development. (2) Monitoring for fossil material of all major surface clearance and deeper (> 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. (3) Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional palaeontologist. (4) A protocol for Chance Fossil Finds is appended to this report (Appendix 2). These recommendations must be included within the Environmental Management Programmes (EMPrs) for the Patatskloof WEF, BESS and grid connection developments.

Specialist Study	Findings	Recommendations
	No palaeontological High Sensitivity or No-Go areas have been identified within the WEF and grid connection project areas. None of the recorded fossil sites lies within the development footprint as currently defined. Pending the potential discovery of significant new fossil material here during the construction phase, no specialist palaeontological monitoring or mitigation is recommended for these developments. The Environmental Site Officer (ESO) should be made aware of the possibility of important fossil remains (bones, teeth, fish, petrified wood, plant-rich horizons etc) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (> 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional palaeontologist. Provided that these monitoring and mitigation measures are followed through, residual impacts for the Patatskloof WEF and grid projects are rated as LOW. Inevitable loss of some fossil heritage during the construction phase may be - at least partially - offset by an improved understanding of local palaeontological heritage through professional recording and mitigation of any significant new fossil finds (This may be considered as a positive impact). Due to the generally low palaeosensitivity of the Ceres Karoo as a whole, anticipated cumulative impacts of the known renewable energy projects proposed or authorised in the region are assessed as LOW (negative) with and without mitigation. It is concluded that, as far as	

Specialist Study	Findings	Recommendations
	fossil heritage resources are concerned, the proposed Patatskloof WEF and grid connection projects, whether considered individually or together, will not result in any unacceptable loss or impact considering all the renewable energy projects proposed in the area. This analysis only applies provided that all the proposed monitoring and mitigation recommendations made for the other renewable energy projects proposed or authorised in the Ceres Karoo are fully and consistently implemented.	
Social	While the project will create employment for local communities during the construction and operational phases, the more significant positive impact of the project will be the contribution it will make towards renewable energy infrastructure. Research recently published by Meridian Economics, in collaboration with the CSIR, indicates that "[in all realistic mitigation scenarios, the majority of new build capacity is wind and solar PV" **Invalid source specified.**, and highlights an urgent need for the country to accelerate the RE build pathway. In addition, the South African Climate Change Coordinating Commission, is considering a more ambitious emissions target and is suggesting changes to the country's energy plan **Invalid source specified.**. Considering the impacts discussed above, it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to any one project. The initiative to address these cumulative impacts lies at a far higher level than at an individual project level. In this regard, the Western Cape Government has undertaken an exercise to address intergovernmental readiness for the large development scenarios in the Central Karoo; which is a positive step towards	Considering all social impacts associated with the project, it is evident that, at the social level, the positive elements outweigh the negative and that the project carries with it a significant social benefit at a national level and is therefore supported. In addition, no compelling preference emerges in respect of the alternatives and it would be socially acceptable for the authorisation of either power line alternative.

Specialist Study	Findings	Recommendations
	addressing the cumulative impact of these developments **Invalid source specified.**.	
Aquatic	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment as indicated in the Screening Tool Results (CBA, ESA & NFEPA). The information collected, was also compared to previous assessments within the region by members of EnviroSci, used in the assessment of the wind farms that have been completed. In summary three key aquatic habitats were observed and mapped and then rated based on their sensitivity to the proposed development. These habitats included: 1. Alluvial Wash floodplains (two sub types) 2. Watercourses with or without riparian vegetation 3. Minor watercourses Several High Sensitivity Habitats were observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated after and inspection is conducted by the specialist once the localities have been finalised.	It is recommended that Grid Options 1 and 6, should be considered further to minimize the extent of access needed when compared to the other 4 grid options. The project must still be assessed once the roads layout has been provided, coupled to a micrositing walkdown once all information is available. Noteworthy areas, that should be avoided, include the Very High Sensitivity areas as shown in this report. Existing crossings may be used and/or upgraded that intersect these systems however, but these crossings, detailed monitoring plan must be developed in the pre-construction phase.
Transportation	The development, is located in a rural part of the Western Cape Province, with the existing road network able to provide access to the development. A number of	• The existing access points from Road OP06121 does not have sufficient sight distance or is located in a drainage line and hence will require

Specialist Study	Findings	Recommendations
	other renewable energy developments have already been completed or are in the process of being completed in the immediate area. The construction phase or Balance of Plant phase of this development will typically generate the highest number of additional vehicles. Of these additional vehicles, ±57 trips / hour will occur in the morning and afternoon outside of the peak period, while ±4 trips / hour will occur during the midday peak for construction material and abnormal loads. The impact will however be temporary and are considered to be nominal if adequately mitigated. During the operation phase, it is expected that the facility will accommodate ±30 employees and generate an additional ±10 trips / day in the morning and afternoon peak period. This impact is considered to be nominal.	relocation to a new access position @ Km 13.44. • External road upgrades required on Road DR01475 between Km 50.73 – Km 46.60 • External road upgrades required on Road OP06121 between Km 13.44 – Km 16.70 • Intersection upgrade to Road DR01475 and Road OP06121 junction • All external road upgrades require approval and a wayleave application from the Western Cape Department of Transport & Public Works prior to work commencing. • Mitigation measures to be included in the construction / Balance of Plant phase: ○ Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods. ○ Stagger material, component and abnormal loads deliveries ○ Adequate road signage on all external roads carrying development traffic according to the SARTSM ○ Reduction in speed of vehicles ○ Adequate enforcement of the law ○ Implementation of pedestrian safety initiatives ○ Regular maintenance of farm fences & access cattle grids ○ Construction of gravel roads in terms of TRH20 ○ Implement a road maintenance program under the auspices of the respective transport department. ○ Possible use of an approved dust suppressant techniques
Visual	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development	The proposed new power line route alignment is expected to be highly incongruous as much of the route is close to existing 400kV power lines. In addition, the grid connection infrastructure is intended to serve the proposed WEF and

Specialist Study	Findings	Recommendations
	with associated grid connection infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be significantly reduced by the presence of the Kappa Substation, high voltage power lines and Perdekraal East WEF within the study area. A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The study area is not typically known for its tourism significance and there is however limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of twenty-one (21) potentially sensitive receptors were identified within the combined study area, although only eleven (11) of these were found to be within the viewshed for the proposed WEF. Two (2) of these receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. One of the sensitive receptors is expected to experience high levels of visual impact from the WEF facility, namely Ibhadi Game Lodge. It should be noted that this rating is largely due to the location of the main residence / accommodation complex inside the Patatskloof WEF development area. It is therefore assumed that the property owners have a vested	as such, will only be built if this project is developed. The power lines and substations are therefore likely to be perceived as part of the greater WEF development and the visual impact will be relatively minor when compared to the visual impact associated with the development as a whole. The impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

Specialist Study	Findings	Recommendations
	interest in the proposed development and would not perceive the WEF in a negative light. Accordingly, visual impacts would be significantly reduced. The remaining sensitive receptor would experience only moderate levels of impact. Nine (9) of the receptors identified are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Only two (2) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. Neither of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Five (5) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Patatskloof WEF development while the remaining two (2) receptors would only experience low levels of visual impact. Both sensitive receptors (SR1 and SR2) identified within 5km of the power line assessment corridors would experience only moderate levels of visual impact as a result of the proposed 132kV power line associated with the Patatskloof WEF development. Impacts affecting SR2 are however expected to be reduced in light of the fact that this receptor is located in the Patatskloof WEF development area. Three (3) of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed power line. The high sensitivity rating relates largely to the fact that these receptors are located in areas of high visual contrast that are also	

Specialist Study	Findings	Recommendations
	relatively close to the proposed power line route alignments. One of these receptors, namely VR3 is in fact located within the assessment corridors for power line Options 2, 3, 4 and 5. Impacts affecting these receptors are however expected to be reduced by the presence of existing high voltage power lines already visible to these receptors. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. The remaining two (2) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line. Although the N1 receptor road traverses the study area, wind turbines and power line infrastructure will not be visible from this section of the road.	

ENVIRONMENTAL IMPACT STATEMENT

The implementation of the Patatskloof Grid Infrastructure will assist expected growth in demand for installed power generation capacity. This in turn will assist with the increasing economic growth and social development within South Africa. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. Wind is a free and infinite resource that occurs naturally in the environment.

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted and that the preferred route alignment being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

The **agricultural assessment** (refer to **Appendix 6**) concluded that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site and is therefore acceptable. This is substantiated by the facts that the land is of very limited land capability and is not suitable for the production of cultivated crops, the amount of agricultural land loss is within

the allowable development limits prescribed by the agricultural protocol, the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits, and that the proposed development poses a low risk in terms of causing soil degradation. From an agricultural impact point of view, the specialist recommended that the development be approved and that the approval is not subject to any conditions.

The **avifaunal assessment** (refer to **Appendix 6**) concluded that the proposed Patatskloof WEF grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. Out of the six (6) grid corridor alternatives, Corridor Option 3 and Corridor Option 6 are most preferred from an avifaunal perspective. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

Based on the findings of the **terrestrial and the aquatic assessment** (refer to **Appendix 6**), the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. Lastly no preference is provided with regard the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned, while making use of existing tracks.

According to the **geotechnical assessment** undertaken for the project (refer **Appendix 6**), no fatal flaws or sensitivities have been identified within or close to the grid corridors. It is therefore recommended that the proposed activity be authorised.

According to the **archaeological impact assessment** (refer to **Appendix 6**), the overall impact of the Patatskloof Grid, on the heritage resources, is seen as acceptably **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorized.

The **cultural impact assessment** (refer to **Appendix 6**) concluded that the substation and gridline locations require some layout alteration to accommodate the CBA. With the recommended buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Patatskloof grid connection and infrastructure can be reduced from very high to moderate. There are no fatal flaws and the development can proceed with CLA recommendations and mitigation in place.

The **palaeontological report** (refer to **Appendix 6**) concluded that the proposed Patatskloof grid connection development is not fatally flawed and, on condition that the recommended mitigation measures are included within the EMPr and implemented in full, there are no objections on palaeontological heritage grounds to their authorization.

According to the **social impact assessment** (refer to **Appendix 6**), considering all social impacts associated with the project, it is evident that, at the social level, the positive elements outweigh the negative and that the project carries with it a significant social benefit at a national level and is therefore supported. In addition, no compelling preference emerges in respect of the alternatives and it would be socially acceptable for the authorisation of either power line alternative.

According to the **transportation assessment** (refer to **Appendix 6**), the Patatskloof grid infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures proposed are implemented, and hence the Environmental Authorisation (EA) should be granted for the BA application.

The **visual impact assessment** (refer to **Appendix 6**) concluded that the potential visual impacts associated with the proposed Patatskloof grid infrastructure development are negative and of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual perspective and the EA should be granted. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

PATATSKLOOF GRID INFRASTRUCTURE

DRAFT BASIC ASSESSMENT REPORT

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS

Acceptability: The evaluation of the risk in comparison to certain known level of risk in other areas.

Alternative: Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.

Alluvial: Resulting from the action of rivers, whereby sedimentary deposits are laid down in river channels, floodplains, lakes, depressions etc.

Archaeological resources: This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Biodiversity: The diversity of genes, species and ecosystems, and the ecological and evolutionary processes that maintain that diversity.

Critical Biodiversity Areas: Areas required to meet biodiversity targets of representivity and persistence for ecosystems, species and ecological processes, determined by a systematic conservation plan. They may be terrestrial or aquatic, and are mostly in a good ecological state. These areas need to be maintained in a natural or near-natural state, and a loss or degradation must be avoided. If these areas were to be modified, biodiversity targets could not be met.

Cultural landscape: A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). Includes and extends beyond the study site boundaries.

Cultural significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Development: This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Development Area: The development area is the identified area which is located within the project site where the Renewable Energy Facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints.

Development Envelop: An area identified considering and avoiding identified environmental constraints present within the development area.

Development Footprint: Means any evidence of physical alteration as a result of the undertaking of any activity.

Ecosystem services: The benefits that people obtain from ecosystems, including provisioning services (such as food and water), regulating services (such as flood control), cultural services (such as recreational benefits), and supporting services (such as nutrient cycling, carbon storage) that maintain the conditions for life on Earth.

Endemic: Restricted or exclusive to a particular geographic area and occurring nowhere else. Endemism refers to the occurrence of endemic species.

Environmental Management Programme (EMPr): A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Habitat: The area of an environment occupied by a species or group of species, due to the particular set of environmental conditions that prevail there.

Heritage: That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage Resources: This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;

- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Kilovolt (kV): a unit of electric potential equal to a thousand volts (a volt being the standard unit of electric potential. It is defined as the amount of electrical potential between two points on a conductor carrying a current of one ampere while one watt of power is dissipated between the two points).

Landscape character: A distinct, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Mitigate: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

"No-Go" option: The “no-go” development alternative option assumes the site remains in its current state, i.e. there is no construction of a wind energy facility and associated infrastructure in the proposed project area.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Project site/ proposed development: The project site is defined as the total extent of the land parcels for the proposed project.

Red Data Species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Red List: A publication that provides information on the conservation and threat status of species, based on scientific conservation assessments.

Rehabilitation: Less than full restoration of an ecosystem to its pre-disturbance condition.

Restoration: To return a site to an approximation of its condition before alteration.

Riparian: The area of land adjacent to a river or stream that is, at least periodically, influenced by flooding.

Sense of place: The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

Species of Special / Conservation Concern: Species that have particular ecological, economic or cultural significance, including but not limited to threatened species.

Threatened Ecosystems: An ecosystem that has been classified as Critically Endangered, Endangered or Vulnerable, based on analysis of ecosystem threat status. A threatened ecosystem has lost, or is losing, vital aspects of its structure, composition or function. The Biodiversity Act makes provision for the Minister or Environmental Affairs, or a provincial MEC of Environmental Affairs, to publish a list of threatened ecosystems.

Threatened Species: A species that has been classified as Critically Endangered, Endangered or Vulnerable, based on a conservation assessment using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.

Visual character: The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.

Visual impact: The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.

Visual receptors: An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.

Visual sensitivity: The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

ACRONYMS

AAA	- Astronomy Advantage Area
ATNS	- Air Traffic and Navigation Services Company Limited
AIA	- Archaeological Impact Assessment
APHP	- Association of Professional Heritage Practitioners
ASAPA	- Association of Southern African Professional Archaeologists
BA	- Basic Assessment
BESS	- Battery Energy Storage System
CAA	- Civil Aviation Act (Act No. 13 of 2009)
CARA	- Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA	- Critical Biodiversity Area
CBD	- Convention on Biodiversity
CLA	- Cultural Landscape Assessment
CSP	- Concentrating Solar Power
DBAR	- Draft Basic Assessment Report
DEA	- Department of Environmental Affairs
DFA	- Development Facilitation Act (Act No. 67 of 1995)
DFFE	- Department of Forestry, Fishery and the Environment
DoE	- Department of Energy
DWS	- Department of Water and Sanitation
EA	- Environmental Authorisation
EAP	- Environmental Assessment Practitioner
EAPASA	- Environmental Assessment Practitioner Association of South Africa
ECA	- Environmental Conservation Act (ECA) (Act No. 73 of 1989)
EIA	- Environnemental Impact Assessment
EMPr	- Environmental Management Programme
ERA	- The Electricity Regulation Act No. 4 of 2006
ESA	- Ecological Support Area
FBAR	- Final Basic Assessment Report
GA	- General Authorisation
GHG	- Green House Gases
GIS	- Geographic Information System
GW	- Gigawatts
HIA	- Heritage Impact Assessment
HAS	- Hazardous Substances Act (Act No. 15 of 1973)
HWC	- Heritage Western Cape
IAIAsa	- International Association for Impact Assessment South Africa
I&AP(s)	- Interested and/or Affected Party/Parties
IDP	- Integrated Development Plan
IPP(s)	- Independent Power Producers
IRP	- Integrated Resource Planhwc
kV	- Kilo Volt
Mainstream	- South Africa Mainstream Renewable Power Developments (Pty) Ltd
MER	- Municipal Energy Resilience
MPRDA	- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended)
MSA	- Municipal Systems Act (Act No. 32 of 2000)
MW	- Megawatt

NEA	- The National Energy Act (Act No. 34 of 2008)
NEMA	- National Environmental Management Act (Act No. 107 of 1998)
NEM:AQA	- National Environmental Management: Air Quality Act (Act No. of 2004)
NEM:BA	- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:PAA	- National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended)
NFA	- The National Forest Act (Act No. 84 of 1998)
NFEPA	- National Freshwater Ecosystem Priority Areas
NHRA	- National Heritage Resources Act (Act No. 25 of 1999)
NPAES	- National Parks Area Expansion Strategy
NRTA	- National Road Traffic Act (Act No. 93 of 1996)
NSBA	- National Spatial Biodiversity Assessment
NSD	- Noise Sensitive Development
NWA	- National Water Act (Act No. 36 of 1998)
O&M	- Operation and Maintenance
OHSA	- Occupational Health and Safety Act (Act No. 85 of 1993)
PAIA	- Promotion of Access to Information Act, 2000
PIA	- Palaeontological Impact Assessment
PPA	- Power Purchase Agreement
PPP	- Public Participation Process
POPIA	- Protection of Public Information Act (Act No. 4 of 2013
PV	- Photo Voltaic
REDZ	- Renewable Energy Development Zone
REIPPPP	- Renewable Energy Independent Power Producer Procurement Programme
RE	- Renewable Energy
RSA	- Road Safety Act (Act No. 93 of 1996)
SA	- South Africa
SACAA	- South African Civil Aviation Authority
SACNASP	- South African Council for Natural and Scientific Professions
SAHRA	- South African Heritage Resources Agency
SAHRIS	- South African Heritage Resources Information System
SALA	- Subdivision of Agricultural Land Act (Act No. 70 of 1970)
SALT	- Southern African Large Telescope
SANBI	- South African National Biodiversity Institute
SANS	- South African National Standards
SAWEA	- South African Wind Energy Association
SDF	- Spatial Development Framework
SKA	- Square Kilometre Array
TCS	- Traffic Counting System
VIA	- Visual Impact Assessment
WCDEADP	- Western Cape Department of Environmental Affairs and Development Planning
WCG	- Western Cape Government
WEF	- Wind Energy Facility
WMA	- Water Management Area
WSA	- Water Services Act (Act No. 108 of 1998)
WUL	- Water Use License
WULA	- Water Use License Application

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

PATATSKLOOF GRID INFRASTRUCTURE

DRAFT BASIC ASSESSMENT REPORT

1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream') is proposing to develop one (1) new 33/132kV on-site substation as well as one (1) new associated 132kV overhead power line for the proposed Patatskloof Wind Energy Facility (WEF) (part of a separate Basic Assessment (BA) process / application: **DFFE Reference Number: To be allocated**), located near the town of Ceres in the Witzenberg Local Municipality, Cape Winelands District Municipality, Western Cape Province of South Africa (hereafter referred to as the 'proposed development')

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental processes for the proposed construction of the Patatskloof On-site Switching / Collector Substation and associated 132kV Power Line. The proposed development requires an EA from the National Department Forestry, Fisheries and the Environment (DFFE). The Basic Assessment (BA) process for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the NEMA. In terms of these regulations, the proposed overhead power line and 33/132kV on-site switching substation / collector substation would be subject to a BA process in terms of the NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 (as amended). The provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning - WC DEA&DP) as well as CapeNature will also be consulted.

The proposed grid connection infrastructure is located within the Electricity Grid Corridor (EGI) as published in terms of Section 24(5) (a) and (b) of the NEMA in GN R113 of 16 February 2018. Accordingly, a BA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed grid project.

The overall objective of the proposed development is to feed the electricity generated by the proposed Patatskloof WEF into the national grid.

This report forms part of one (1) of two (2) grid connection infrastructure developments (namely on-site substations and overhead power lines) that are being proposed on nearby properties by Mainstream. In addition, two (2) WEF developments are also being proposed on adjacent properties by Mainstream. The other proposed developments (i.e. WEF, substation and power line) which are being proposed on nearby properties include the following:

- Patatskloof WEF – **DFFE Reference Number:** To be allocated (part of a separate BA process / application); and

- Karee WEF – **DFFE Reference Number:** To be allocated (part of a separate BA process / application);
- Karee WEF Substation and Power Line – **DFFE Reference Number:** To be Allocated (part of separate BA process / application).

At this stage it is anticipated that the proposed grid connection infrastructure to serve the Patatskloof WEF (part of separate application) will include the following components:

- One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site substation to Adamskraal Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

Although the WEF (part of separate application) and associated grid connection infrastructure (part of this application) will be assessed separately, a single public participation process is being undertaken to consider all of the proposed developments [i.e. two (2) WEF EIAs and two (2) grid connection infrastructure BAs]. The potential environmental impacts associated with the proposed development have been assessed as part of the cumulative impact assessment.

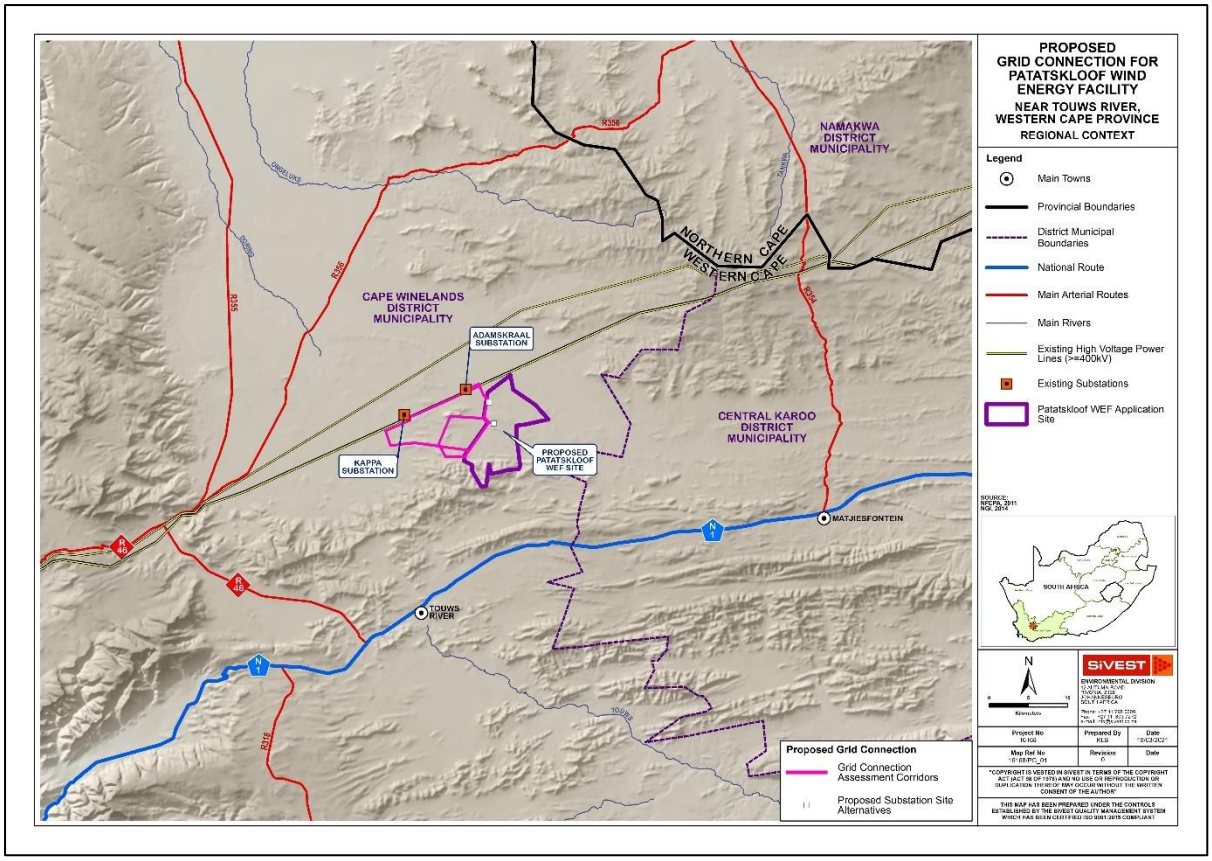


Figure 1: Patatskloof Regional Context

1.1 Content Requirements for a Basic Assessment Report

A Basic Assessment Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application and must include a proper understanding of the process, informing all preferred alternatives, the scope of the assessment, an assessment of the significant impacts, findings of the specialists and proposed mitigation measures, and the consultation process followed through the BA process. The content requirements for a BA Report (as provided in Appendix 1 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

Table 1: Content requirements for a Basic Assessment Report

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
Appendix 1, Section 3 (1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—	Refer below.
Appendix 1, Section 3 (a)	Details of –	Section 4
	(i) The EAP who prepared the report; and (ii) The expertise of the EAP, including a curriculum vitae.	
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name;	Section 5 Section 6

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
	(iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 5 Section 6
Appendix 1, Section 3 (d)	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.	Section 7
Appendix 1, Section 3 (e)	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 planning 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 frameworks, and instruments;	Section 11 and 12
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 13
Appendix 1, Section 3 (g)	a motivation for the preferred site, activity and technology alternative;	Section 14
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred alternative within the site, including-	Section 14
	(i) Details of all the alternatives considered;	Section 14
	(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 14.2
	(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;	TBC in Final BAR Section 14.2.4
	(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9 and 10
	(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 the impacts- (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated.	Section 15
	(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Appendix 7
	(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 geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 16

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
	(viii) The possible mitigation measures that could be applied and level of residual risk;	Section 15
	(ix) The outcome of the site selection matrix;	Section 14
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Not Applicable
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 14
Appendix 1, Section 3 (i)	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.	Appendix 7 and Section 15
Appendix 1, Section 3 (j)	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 15
Appendix 1, Section 3 (k)	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 17
Appendix 1, Section 3 (l)	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 18
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Refer attached in Appendix 8
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 20
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 21
Appendix 1, Section 3 (p)	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 18 and Section 22
Appendix 1, Section 3 (q)	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.	Section 22

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report; (ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties; (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 and affected parties.	Section 23
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Not Applicable at this stage
Appendix 1, Section 3 (t)	any specific information required by the Competent Authority.	Section 24
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	None
Appendix 1, Section 3 (2)	(2) Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply.	Generic EMPrs compiled

2. PROJECT TITLE

Basic Assessment (BA) for the Proposed Development of the 132kV Portion/Yard of the 33kV/132kV Portion of the shared on-site Substation and associated 132kV Power line for the Patatskloof Wind Energy Facility (WEF), located near Ceres in the Witzenberg Local Municipality, Cape Winelands District in the Western Cape Province.

3. DETAILS OF APPLICANT

3.1 Name and contact details of the Applicant

Name and contact details of Applicant:

Table 2: Name and contact details of the applicant

Business Name of Applicant	South Africa Mainstream Renewable Power Developments (Pty) Ltd
Physical Address	4th Floor Mariendahl House, Newlands on Main, Cnr Main Road and Campground, Claremont, Cape Town
Postal Address	PO Box 45063, CLAREMONT, Cape Town
Postal Code	7735
Telephone	073 871 5781
Fax	021 671 5665
Email	eugene.marais@mainstreammrp.com

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTTIONER AND SPECIALISTS

4.1 Name and contact details of the Environmental Consultant

The table below provides the name and contact details of the Environmental Consultants who prepared this report:

Table 3: Name and contact details of the Environmental Consultant who prepared the report

Business Name of EAP	SiVEST SA (PTY) Ltd
EAP	Rendani Rasivhetshele
Physical Address	12 Autumn Road, Rivonia
Postal Address	PO Box 2921, Rivonia
Postal Code	2128
Telephone	011 798 0600
Email	rendanir@sivest.com

4.2 Names and expertise of the Environmental Assessment Practitioner (EAP)

The table below provides the names of the EAP's who prepared this report:

Table 4: Names and details of the expertise of the EAP's involved in preparing this report

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette *(Cert.Sci.Nat[1].)*	MEnvMgt. (Environmental Management)	SACNASP[2] Registration No. 120356 EAPASA[3] Registration No. 2019/1560 IAIAsa[4]	19
Natalie Pullen	MSc (Environmental Biotechnology)	EAPASA[3] IAIAsa[4]	18
Rendani Rasivhetshele – EAP	BSc Honours Environmental Management	EAPASA Registration No. 2019/1729	6

CV's of SiVEST personnel and EAP declaration are attached in **Appendix 1.**

4.3 Names and expertise of the specialists

Specialist studies have been conducted in terms of the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA when applying for EA, as well as the EIA Regulations, 2014 (as amended). The table below provides the names of the specialists involved in the project which have also been guided by the DFFE National Screening Tool:

[1] Certificated Natural Scientist

[2] South African Council for Natural and Scientific Professions

[3] Environmental Assessment Practitioners Association of South Africa

[4] International Association for Impact Assessment South Africa

Table 5: Names of specialists involved in the project

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
SLR Consulting	Kerry Schwartz	Visual Impact Assessment	BA (Geography) GTc GISc 1187	25
SiVEST SA (Pty) Ltd	Merchandt Le Maitre	Transportation Impact Assessment	N Dip: Civil Engineering B Tech: Civil Engineering Pr.Tech.Eng. (Reg. No. 2018300094)	16
PGS Heritage (Pty) Ltd	Wouter Fourie	Heritage Impact Assessment	Professional Archaeologist (ASPA) Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP)	22
	John Almond	Palaeontological Impact Assessment	PhD (Palaeontology) Palaeontological Society of South Africa, Associated of Professional Heritage (W Cape)	40
	Nikki Mann	Archaeological Assessment	Msc Archaeology Professional Archaeologist with the Associated of Southern African Professional Archaeologists (ASAPA)	7
	Emmylou Bailey	Cultural Landscape Assessment	MA Archaeology and Heritage Management APHP, ASAPA	15
Gage Consulting	Duan Gage	Desktop Geotechnical Assessment	Professional registered SACNASP, PrNatSci (137543), MSAIEG, Master of Science (Engineering Geology), *Doctoral Candidate (Engineering Geology)	4
Johann Lanz Consulting	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	M.Sc. (Environmental Geochemistry)	24
Dr. Neville Bews & Associates	Dr Neville Bews	Social Impact Assessment (desktop)	D Litt et Phil	20

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
EnviroSci (Pty) Ltd	Dr Brian Colloty	Surface Water Impact Assessment	Ph D (Botany – Estuaries & Mangroves)	25
		Biodiversity Impact Assessment	Pr. Sci. Nat. 400268/07	25
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22

5. LOCATION OF THE ACTIVITY

The proposed grid infrastructure is located approximately 25km north-east of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality.

At this stage, it is proposed that the 132kV power lines will connect the Patatskloof WEF on-site substation to the national grid via either Adamskraal or Kappa Substation. (**Figure 2** below).

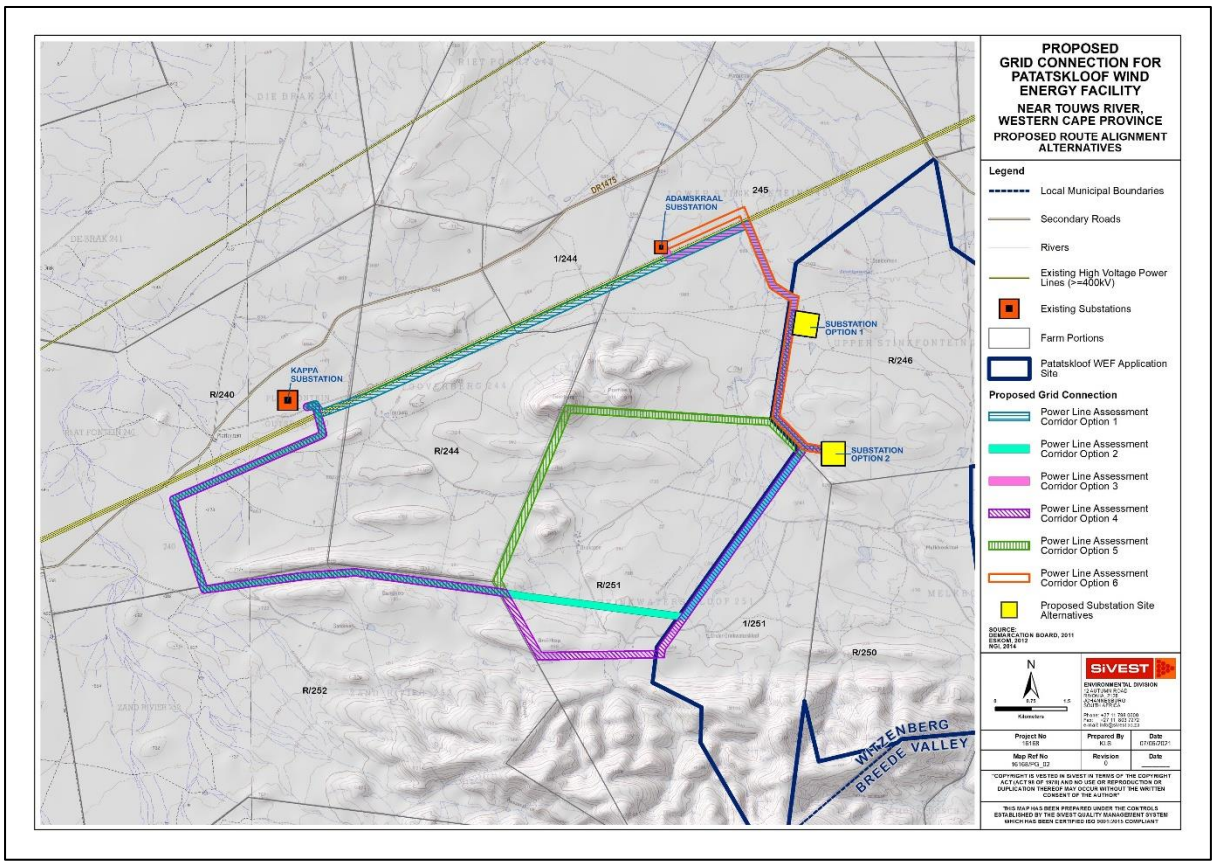


Figure 2: Site locality

5.1 21 Digit Surveyor General Codes of the site

Table 6: 21 Digit Surveyor General Code

21 Digit Code	Description
C01900000000024000000	FARM PLATFONTEIN NO 240
C01900000000024400001	PORTION 1 OF THE FARM TOOVERBERG NO 244
C01900000000024400000	REMAINDER OF THE FARM TOOVERBERG NO 244
C01900000000024500000	FARM LOWER STINKFONTEIN NO 245
C01900000000024600001	REMAINDER OF THE FARM UPPER STINKFONTEIN NO 246
C01900000000025100001	PORTION 1 OF THE FARM DRINKWATERS KLOOF NO 251
C01900000000025100000	REMAINDER OF THE FARM DRINKWATERS KLOOF NO 251
C01900000000025200000	REMAINDER OF THE FARM ZAND RIVIER NO 252

5.2 Coordinates of the site

The coordinates for the grid connection and associated substations are as follows:

Table 7: Grid Connection Coordinates

PATATSKLOOF GRID CONNECTION				
CENTRE LINE COORDINATES (DD MM SS.sss)				
	START POINT	MIDDLE POINT	END POINT	APPROX LENGTH (KM)
OPTION 1 (from Substation 1)	S33° 5'41.41"	S33° 5'29.65"	S33° 6'36.07"	12.50 km
	E20° 7'21.27"	E20° 4'16.19"	E20° 0'48.56"	
OPTION 1 (from Substation 2)	S33° 7'8.56"	S33° 4'59.71"	S33° 6'36.07"	15.85 km
	E20° 7'49.78"	E20° 5'37.07"	E20° 0'48.56"	
OPTION 2 (from Substation 1)	S33° 5'41.41"	S33° 8'56.71"	S33° 6'36.57"	23.81 km
	E20° 7'21.27"	E20° 5'7.72"	E20° 0'45.15"	
OPTION 2 (from Substation 2)	S33° 7'8.56"	S33° 8'55.29"	S33° 6'36.63"	21.25 km
	E20° 7'49.78"	E20° 4'52.16"	E20° 0'45.08"	
OPTION 3 (from Substation 1 to Adamskraal Substation)	S33° 5'41.00"	S33° 4'39.75"	S33° 4'46.97"	4.48 km
	E20° 7'21.64"	E20° 6'46.98"	E20° 5'36.55"	

OPTION 3 (from Substation 2 to Adamskraal Substation)	S33° 7'8.56"	S33° 5'27.83"	S33° 4'46.97"	7.86 km
	E20° 7'49.78"	E20° 7'21.66"	E20° 5'36.55"	
OPTION 4 (from Substation 1)	S33° 5'33.26"	S33° 9'26.43"	S33° 6'36.57"	25.05 km
	E20° 7'21.09"	E20° 4'43.05"	E20° 0'45.15"	
OPTION 4 (from Substation 2)	S33° 7'8.56"	S33° 9'26.31"	S33° 6'36.57"	22.46 km
	E20° 7'49.78"	E20° 4'6.74"	E20° 0'45.15"	
OPTION 5 (from Substation 1)	S33° 5'33.26"	S33° 8'24.91"	S33° 6'36.57"	23.39 km
	E20° 7'20.50"	E20° 3'25.40"	E20° 0'45.15"	
OPTION 5 (from Substation 2)	S33° 7'8.56"	33° 8'11.58"	S33° 6'36.57"	22.44 km
	E20° 7'49.78"	20° 3'32.10"	E20° 0'45.15"	
OPTION 6 (from Substation 1 to Adamskraal Substation)	S33° 5'40.77"	S33° 4'50.31"	S33° 4'46.97"	4.49 km
	E20° 7'21.24"	E20° 6'51.76"	E20° 5'36.55"	
OPTION 6 (from Substation 2 to Adamskraal Substation)	S33° 7'8.56"	S33° 5'34.66"	S33° 4'46.97"	7.91 km
	E20° 7'49.78"	E20° 7'20.34"	E20° 5'36.55"	

One (1) new 11kV - 33/132kV on-site substation consisting of two (2) portions: IPP portion / yard (33kv portion of the shared 33kv/132kv portion) and an Eskom portion (132kv portion of the shared 33kv/132kv portion) including associated equipment and infrastructure, occupying a total area of approximately 25ha (i.e. 250 000m^2) i.e. 15.5 ha for the IPP Portion and 15.5 ha for the Eskom Portion. The Eskom portion will be ceded over to Eskom once the IPP has constructed the onsite substation. The necessary Transfer of Rights will be lodged with DFFE when required.

A Battery Energy Storage System (BESS) will be located next to the IPP portion / yard of the shared onsite 33/132kV substation and will be included as part of the 15.5ha. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks.

The centre point coordinates for the two (2) onsite substation location alternatives are listed in **Table *8*** below. It is reiterated that the onsite substation consisting of two (2) portions: IPP portion / yard (33kv portion of the shared 33kv/132kv portion) and an Eskom portion (132kv portion of the shared 33kv/132kv portion) including associated equipment and infrastructure, occupying a total area of

approximately 25ha (i.e. 250 000m^2) i.e. 15.5 ha for the IPP Portion and 15.5 ha for the Eskom Portion. Within the IPP portion, BESS, Construction laydown and Operation and Maintenance (O&M) Buildings will be located:

Table 8: Substation Site Coordinates

PATATSKLOOF GRID CONNECTION		
SUBSTATION, BESS, CONSTRUCTION LAYDOWN, O&M BUILDINGS SITE COORDINATES		
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
SITE ALTERNATIVE	**SOUTH**	**EAST**
OPTION 1	S33° 5'41.80"	E20° 7'31.04"
OPTION 2	S33° 7'10.50"	E20° 7'52.89"

6. SITE LAYOUT/ ROUTE ALIGNMENT PLAN

The Site Layout/Route Alignment Plan is attached in **Appendix 3**.

Photographs of the site are included in **Appendix 4**.

7. ACTIVITY INFORMATION

7.1 Project Description

Electricity generated by the proposed Patatskloof WEF will be fed into the national grid by way of a 132kV overhead power line, connecting the Patatskloof WEF on-site substation to the national grid via to either Kappa Substation or Adamskraal Substation and thereby feeding the electricity into the national grid. **Figure 3** below provides a conceptual diagram of the electricity generation process.

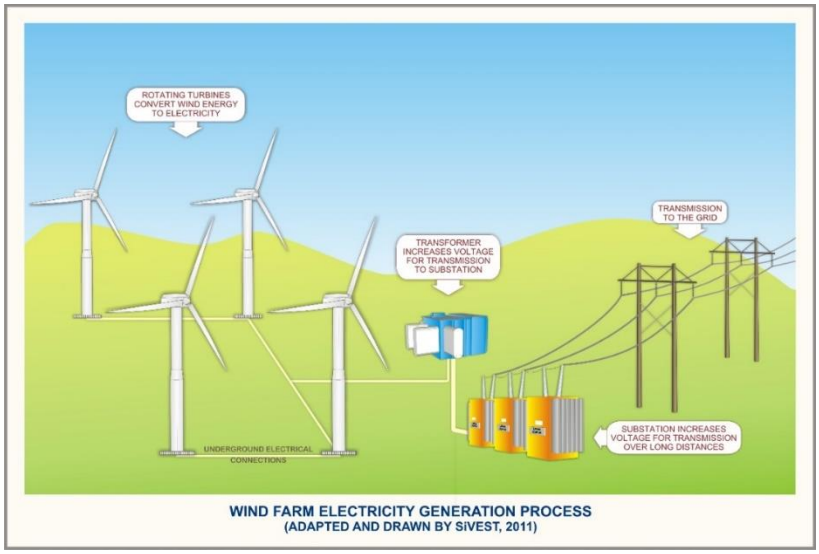


Figure 3: Conceptual WEF electricity generation process showing electrical connections

The proposed grid connection infrastructure to serve the Patatskloof WEF will include the following components:

- One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and
- One (1) new 132kV overhead power line connecting the on-site substation to either Kappa or Adamskraal Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

The Preliminary Route Alignment and substation placement is reflected below in **Figure 4** and attached in **Appendix 3**.

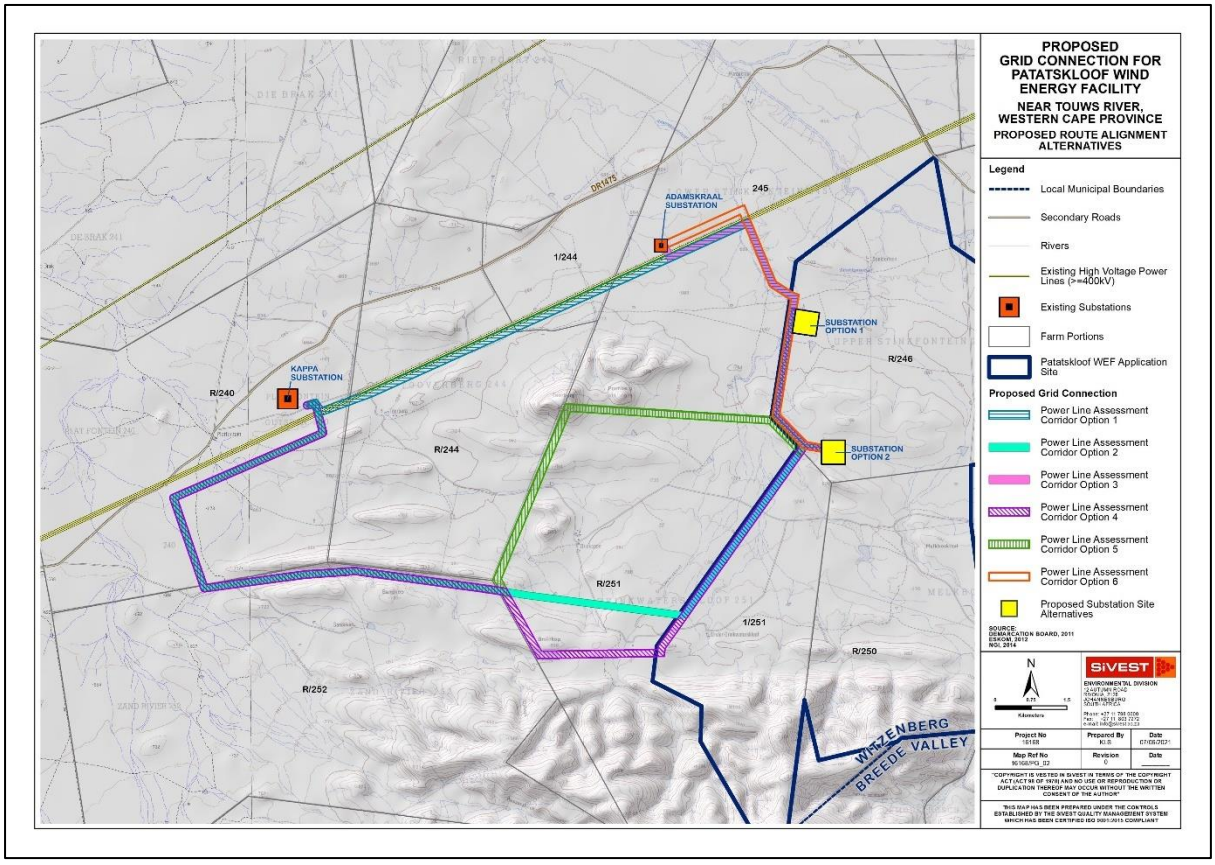


Figure 4: Preliminary route alignment

The project infrastructure has been placed strategically within the development area based on environmental constraints.

A summary of the project technical details is provided in **Table 9** below.

Table 9: Technical Detail Summary

Component	Description / Dimensions
Generation Capacity of Substation	33/132kV
Location	The proposed WEF and associated grid infrastructure is located approximately 25km north-east of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality.
Affected Properties	FARM PLATFONTEIN NO 240 PORTION 1 OF THE FARM TOOVERBERG NO 244 REMAINDER OF THE FARM TOOVERBERG NO 244 FARM LOWER STINKFONTEIN NO 245 REMAINDER OF THE FARM UPPER STINKFONTEIN NO 246 PORTION 1 OF THE FARM DRINKWATERS KLOOF NO 251 REMAINDER OF THE FARM DRINKWATERS KLOOF NO 251 REMAINDER OF SILVERCROW 252 REMAINDER OF FYNBOSLAND 250
SG Codes	• C01900000000024000000 • C01900000000024400001 • C01900000000024400000 • C01900000000024500000 • C01900000000024600001 • C01900000000025100001 • C01900000000025100000 • C01900000000025200000
Area occupied by Substation	Up to approximately 15.5 hectares
Height of Substation	Height of substation will be confirmed during the final design stages of the substation, prior to construction commencing
Transformer Information	▪ Will be a shared substation which will contain transformers for voltage step-up from medium voltage to high voltage. ▪ Direct Current (DC) power from PV modules will be converted into Alternating Current (AC) power in inverters and voltage will be stepped up to medium voltage in inverter transformers
Site Access	Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. It should be noted that the proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 WCG provincial Roads
Grid Connection Information	▪ One (1) new 11-33/132kV on-site substation, situated on a site of occupying an area of up to approximately 2ha. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in both the BA for the WEF and in the BA for the grid infrastructure to allow for handover to Eskom. The applicant will remain in control of the low voltage components (i.e. 33kV components) of the

Component	Description / Dimensions
	substation, while the high voltage components (i.e. 132kV components) of this substation will likely be ceded to Eskom shortly after the completion of construction; and ▪ One (1) new 132kV overhead power line connecting the on-site substation to either Kappa or Adamskraal Substation and thereby feeding the electricity into the national grid. Power line towers being considered for this development include self-supporting suspension monopole structures for relatively straight sections of the line and angle strain towers where the route alignment bends to a significant degree. Maximum tower height is expected to be approximately 25m.

7.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority. The proposed activity is identified in terms of Government Notice No. R. 327, and 324 for activities which must follow a BA Process. The project will trigger the following listed activities:

Table 10: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
11 (i)	**GN R. 327 (as amended) Item 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.	One (1) new 11kV - 33/132kV on-site substation consisting of two (2) portions: IPP portion / yard (33kv portion of the shared 33kv/132kv portion) and an Eskom portion (132kv portion of the shared 33kv/132kv portion) including associated equipment and infrastructure, occupying a total area of approximately 25ha (i.e. 250 000m^2) i.e. 15.5 ha for the IPP Portion and 15.5 ha for the Eskom Portion. The Eskom portion will be ceded over to Eskom once the IPP has constructed the onsite substation. The necessary Transfer of Rights will be lodged with DFFE when required.
12 (ii) (a) (c)	**GN R. 327 (as amended) Item 12:** The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse;	Maintenance access tracks (that do not trigger Listing Notice 1 Activity) associated with the proposed Power lines will cross watercourses. The proposed development will entail the construction of a 132kv overhead power line. The power line will traverse

	(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	some of the surface water features / watercourses identified and/or be located within 32m of some of the surface water features / watercourses identified.
19	**GN R. 327 (as amended) Item 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;	Although the development envelop of the proposed development has been designed to avoid the identified surface water features / watercourses as far as possible, parts of the proposed overhead power line will need to traverse some of the identified surface water features / watercourses. In addition, during construction of the overhead power line, soil will need to be removed from some of the identified surface water features / watercourses.
24 (ii)	**GN R. 327 (as amended) Item 24:** The development of a road - ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	Internal roads are required within the project site in order to provide access to the on-site substation. Roads are also required in order to access the proposed overhead power line. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. As such, the proposed development will involve the construction of new internal roads within the application site as well as the properties traversed by the power line corridor route alternatives, as required. It is proposed that these new internal access roads will be between approximately 8m and 10m wide.
27 (i)	**GN R. 327 (as amended) Item 27:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	The proposed development involves the construction of the 132kv portion of the shared 33kv/132kv onsite substation which will occupy an area of approximately 15.5ha. All vegetation on the substation site will need to be cleared for construction. Cleared vegetation will amount to less than 20ha. One (1) construction laydown / staging area, Operation and Maintenance (O&M) Building of will be required and will be included as part of the 15.5 ha.
28 (ii)	**GN R. 327 (as amended) Item 28:** Residential, mixed, retail, commercial, industrial or institutional developments where	The proposed development site is currently zoned for agricultural land

	such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	use, and the area to be developed will be larger than 1ha.
56 (ii)	**GN R. 327 Item 56:** The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre - (ii) where no reserve exists, where the existing road is wider than 8 metres –	Internal roads are required within the application site in order to provide access to the shared 33kv/132kv on-site substation. Roads are also required in order to access the proposed overhead power line. Existing internal roads may require widening by more than 6m, or lengthening by more than 1km.
Activity No(s):	Provide the relevant **Scoping and EIA Activity(ies)** as set out in **Listing Notice 2** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3** of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
4 i. (ii) (aa)	**GN R. 324 (as amended) Item 4:** The development of a road wider than 4 metres with a reserve less than 13,5 metres. **i. Western Cape** ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	The proposed project is likely to require the development of roads wider than 4m with a reserve of less than 13.5m in areas containing indigenous vegetation. Internal roads with a width of up to approximately 5m wide will provide access to the substation and proposed overhead power line. These roads will occur within the Western Cape Province, outside urban areas.
12 i. ii.	**GN R. 324 (as amended) Item 12:** The clearance of an area of 300 square metres or more of indigenous vegetation **i. Western Cape** ii. Within critical biodiversity areas identified in bioregional plans;	The proposed development will transform more than 300m^2 of indigenous vegetation. Clearance will be required for the proposed on-site substation, internal access roads and overhead power line. Both powerline options traverses a Critical Biodiversity Area (CBA) 1 area just outside the Patatskloof WEF application site (part of a separate application).
14 (ii) (a) (c); i. i. (ff)	**GN R. 324 (as amended) Item 14:** The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more;	The proposed development will entail the construction of an on-site substation as well as associated overhead power line with a physical footprint of 10m^2 or more. The

	where such development 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; **i. Western Cape** i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or inbioregional plans;	proposed substation will occupy an area of up to approximately 2ha. The proposed substation will avoid the surface water features / watercourses identified within the application site where possible, although the power line and/or internal and access roads may traverse some of the surface water features / watercourses identified and/or be located within 32m of some of the surface water features / watercourses identified. The proposed development will be located outside an urban area. In addition, the power line corridor route alternatives traverse Critical Biodiversity Area (CBA) 1 area just outside the Patatskloof WEF application site (part of separate application).
18 i. ii. (aa)	**GN R. 324 (as amended) Item 18:** The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer- **i. Western Cape** ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation	Internal roads are required within the development envelop in order to provide access to the 33kv/132kv shared on-site substation. Roads are also required in order to access the proposed overhead power line. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Existing internal roads will thus need to be upgraded as part of the proposed development (where required). Internal roads will be widened by more than 4m or lengthened by more than 1km. These roads located within the application site will occur within the Western Cape Province, outside urban areas. In addition, the proposed development area contains indigenous vegetation.

8. NATIONAL WEB BASED ENVIRONMENTAL SCREENING TOOL

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the EIA Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

According to the DFFE Screening Tool Report (attached in **Appendix 9**), the following themes described in the table below are applicable to the proposed grid development:

Table 11: Site Sensitivity Verification

Theme	Sensitivity	Comment
Agriculture Theme	Medium	The Agricultural Compliance Statement is included in **Appendix 6** of the Draft Basic Assessment Report. The verification of agricultural sensitivity of the power line route has very little relevance to this assessment. It is important to recognise that the agricultural sensitivity of land, in terms of a particular development, is not only a function of the screening tool sensitivity, which equates to agricultural potential, but is also a function of the severity of the impact which that development poses to agriculture. This is not recognised in the screening tool classification of sensitivity and is therefore a limitation to that sensitivity. This is relevant for transmission lines, because their agricultural impact is usually negligible (see impact assessment section), regardless of the agricultural sensitivity of the land which they traverse. Therefore, in the context of overhead power lines, almost no land can be considered to have high agricultural sensitivity.
Animal Species Theme	High	The Terrestrial Ecological Report is included in **Appendix 6** of the Draft Basic Assessment Report. The DFFE Screening Tool identified three sensitivity ratings within the development study area, very high, medium and low. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool. However, an appropriate layout can be developed to minimise the impact on the Very High areas, but must be verified once the final layout inclusive of roads has been developed.
Aquatic Biodiversity Theme	Very High	The Aquatic Report is included in **Appendix 6** of the Draft Basic Assessment Report. The DFFE Screening Tool identified three sensitivity ratings within the development study area, very high, medium and low. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool. However, an appropriate layout can be developed to minimise the impact on the Very High areas, but must be verified once the final layout inclusive of roads has been developed.
Archaeological and Cultural Heritage Theme	Medium	The Heritage Report is included in **Appendix 6** of the Draft Basic Assessment Report. According to the Heritage screening report, the directly affected area has a low sensitivity rating (Figure 13). The field work in the study area demonstrates that historical structures, archaeological sites and grave and burial grounds of heritage significance warrant conservation. The low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in the region.

Theme	Sensitivity	Comment
Civil Aviation Theme	Medium	The closest airport is the Ceres Airfield (64km) and Robertson Airfield (176km). There may be private nature reserve airfields located closer hence the High sensitivity.
Defence (Wind) Theme	Low	Defence is low and therefore no further assessment required.
Palaeontology Theme	High	The Palaeontology Report is included in **Appendix 6** of the Draft Basic Assessment Report. According to the provisional palaeosensitivity map based on the DFFE Screening Tool, the Patatskloof grid connection project areas includes outcrop areas of Low to Very High palaeosensitivity. It is noted that, in the author's opinion, the palaeosensitivity of many of the formations concerned has been incorrectly coded in the DFFE database. The palaeosensitivity mapping shown by the DFFE Screening Tool is contested by the specialist. Based on previous PIA studies a general LOW palaeosensitivity for all the various corridors is inferred, with no high sensitivity fossil sites reported within them. The only area where fossiliferous Waaipoort concretions have been recorded lies east of and outside the Patatskloof grid connection corridor project area.
Plant Species Theme	Medium	The Terrestrial Ecological Report is included **Appendix 6** of the Draft Basic Assessment Report. The DFFE Screening Tool identified three sensitivity ratings within the development study area, very high, medium and low. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool. However, an appropriate layout can be developed to minimise the impact on the Very High areas, but must be verified once the final layout inclusive of roads has been developed.
Terrestrial Biodiversity Theme	Very High	The Terrestrial Ecological Report is included **Appendix 6** of the Draft Basic Assessment Report. The DFFE Screening Tool identified three sensitivity ratings within the development study area, very high, medium and low. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool. However, an appropriate layout can be developed to minimise the impact on the Very High areas, but must be verified once the final layout inclusive of roads has been developed.

9. DESCRIPTION OF THE RECEIVING ENVIRONMENT

9.1 Geographical

The proposed WEF, BESS and associated grid infrastructure is located approximately 25km north-east of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality (**Figure *5***).

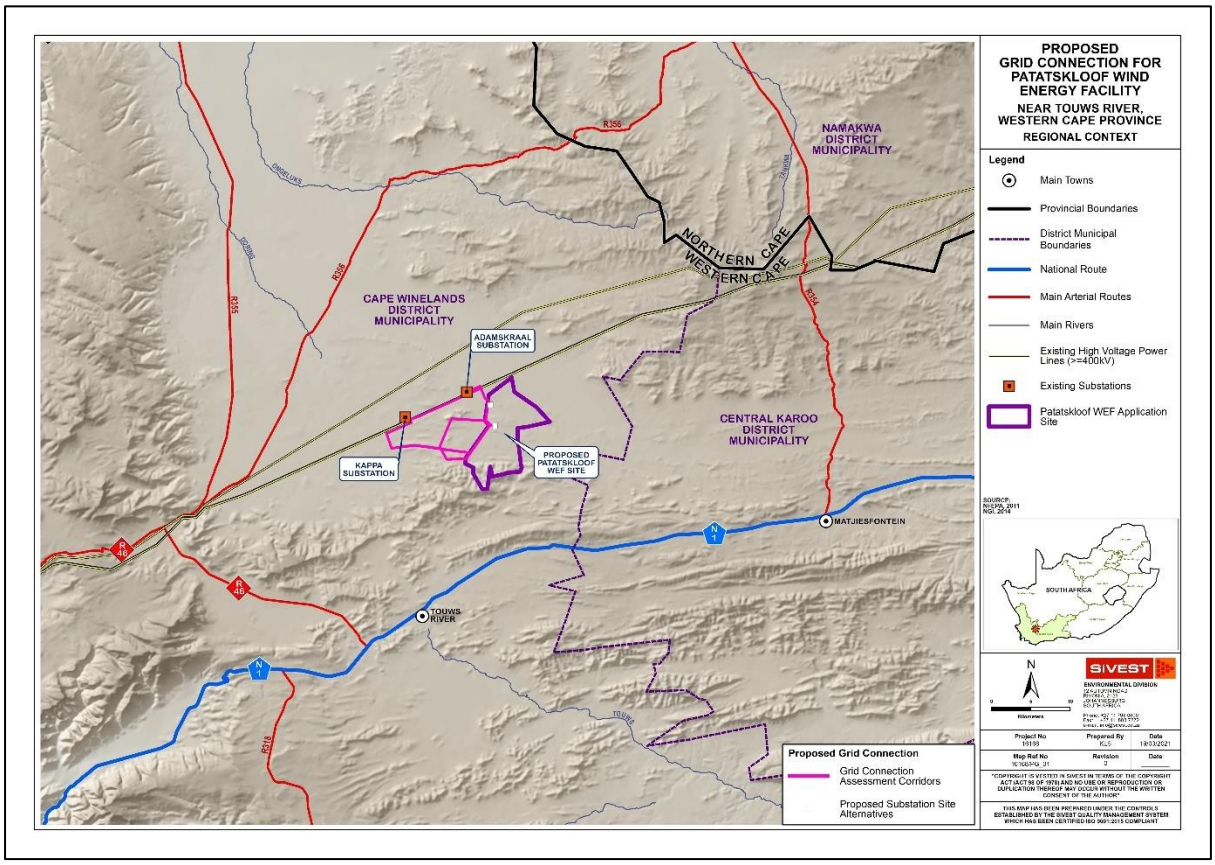


Figure 5: Regional context

9.2 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is characterised by natural vegetation which is dominated by low shrubland (Fynbos), interspersed with grassland. Patches of land classified as “Bare / Barren Land” occur in the north-western sector of the study area. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover.

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively small stretches of land, mostly distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (mostly sheep) farming is the dominant activity although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence. Built form in much of the study area is limited to isolated farmsteads, including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills.

Further human influence is visible in the southern sector of the study area where the the N1 national route traverses the study area in a north-west to south-east direction. The closest built-up area is the town of Touws River which is situated approximately 18km south-west of the proposed application site while Matjiesfontein is some 40kms to the south-east.

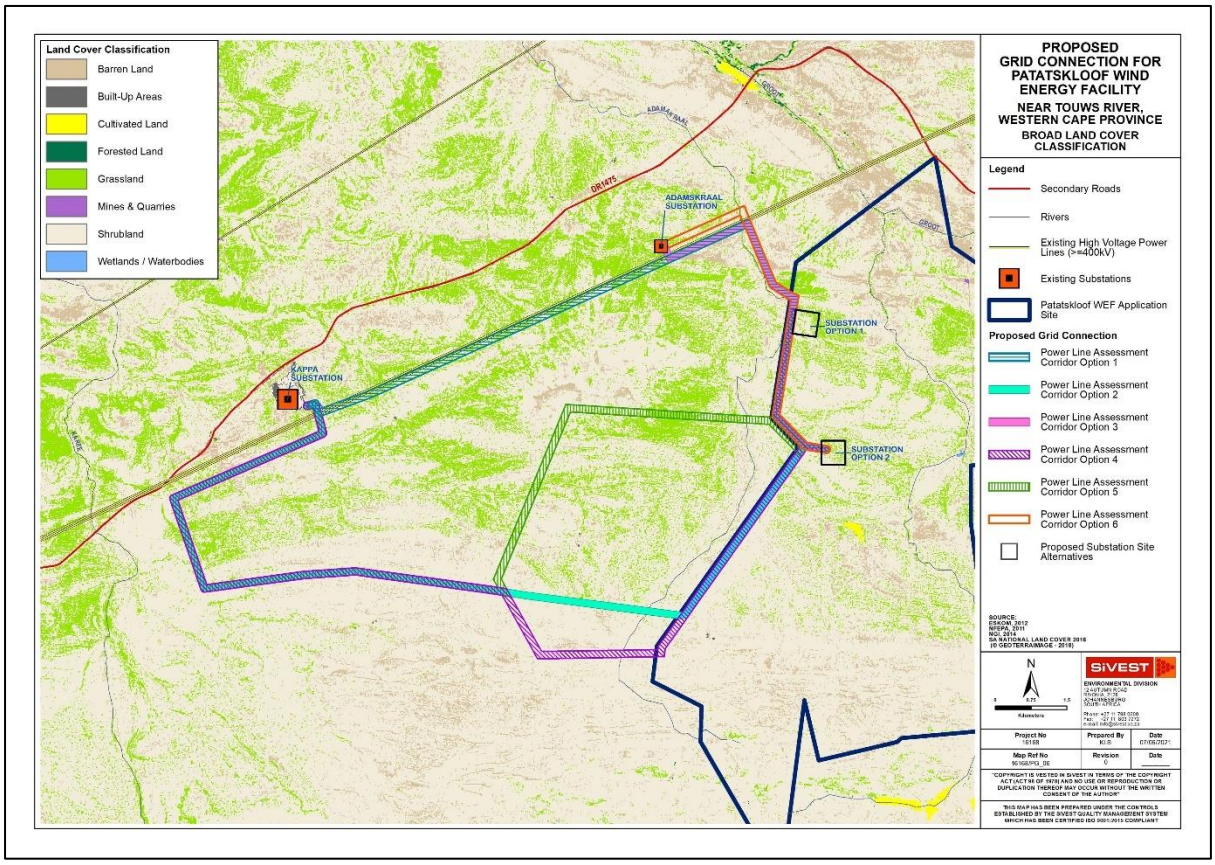


Figure 6: Land Cover Classification

The area can be considered to be a typical Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa's dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008).

9.3 Climate

The site climate classifies as BSk by Köppen-Geiger system, which is a typical cold, semi-arid climate. The area experiences hot, drier, summers and cold, wetter, winters, with precipitation being controlled by cold fronts and orographic rainfall. Rainfall is generally lowest in January (ave. 10 mm) and greatest in June (ave. 31 mm). The hottest month is February and coldest is July with average temperatures of 21°C and 8.9°C, respectively. Climate plays a fundamental role in rock weathering and soil development. The effect of climate on the weathering processes (i.e. soil formation) in a particular area can be determined from the climatic N-value, defined by Weinert (1980). A climatic N-Value of 5 or less implies a water surplus and the dominant mode of weathering is chemical decomposition. These climatic conditions are favourable for the development of a deep residual soil profile. Where the climatic N-value is greater than 5, mechanical disintegration is the predominant mode of rock weathering. In these drier areas residual soils are typically shallow. A climatic N-value of greater that 10 implies an

arid climate with no significant chemical decomposition and residual soil profile development. Weinert's climatic N-value for the site is approximately greater than 10. This implies an arid climate with a non existent or extremely shallow residual soil profile. Very shallow bedrock can be anticipated (unless the rock is covered with transported soils). This climate is conducive to the formation of pedogenic calcrete.

9.4 Topography

The site proposed for the Patatskloof Grid development is located in the scenic Karoo region of the Western Cape which is generally associated with wide vistas and mountainous landscapes. According to the Geotechnical specialist, "*The topography in the general area surrounding the site to the north is characterised by flat plains with areas of slightly more undulating relief, including some local ridges. The topography over the assessment area is undulating but generally gently with minor areas of moderately steep to steep slopes at the ridges (greater than 1:10 based on the local topo-cadastral map). The southern portion of the site and surrounding area is characterised by mountainous areas with steeped side valleys.*

*The chart shows the site is generally flatter than 1:20 but, areas that exceed 1:10, and as steep as 1:5, exist within the grid corridors (***Figure 7***).*

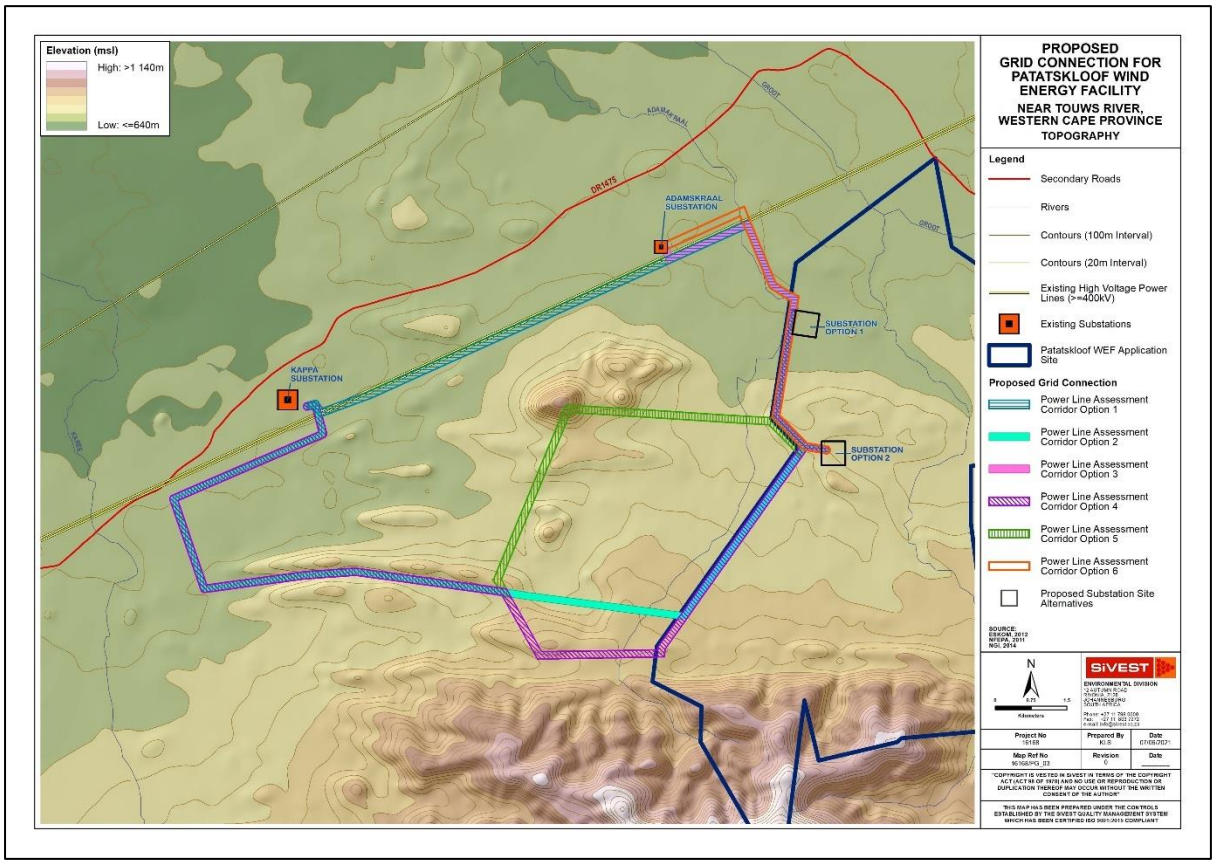


Figure 7: Topography

9.5 Geology and Soils

A desktop geotechnical report was undertaken by Gage Consulting (Pty) Ltd (October 2020). According to the report, "*The site area is dominantly underlain by rock units of Dwyka Group (designated C-Pd). The Dwyka Group comprises of "tillite, boulder shale, sandstone, siltstone, shale, varved shale" of glacial, sub-glacial and subaqueous origin. The most common lithology is the massive diamictite facies, comprising of generally clast-rich diamictite (Johnson et.al., 2006) also referred to as tillite*…

The extreme northern portion of the site is underlain by dark grey to black carbonaceous shale and medium to fine- to medium-grained feldspathic arenite and wacke of the Prince Albert Formation (designated Pp), dark grey shale, with cherty siltstone beds of the Whitehill Formation (designated Pw), siltstone, chert and sandstone with interbedded shale and yellow-weathering mudstone/tuff of the Collingham Formation (designated Pc), and dark grey shale and siltstone of the Tierberg Formation (designated Pt), all forming part of the Ecca Group…

The southern portion of the site is underlain by geological units of the Cape Supergroup. The area is underlain by shale, siltstone and thin sandstone of the Waaipoort Formation (designated Cw), sandstone alternating with shale and siltstone and subordinate grit beds with pebbles of the Floriskraal Formation (designated Cf), thinly laminated shale of the Kweekvlei Formation (designated Ck) and quartzitic sandstone with thin siltstone beds of the Witpoort Formation (designated Dwi), forming the upper Wittenberg Group.

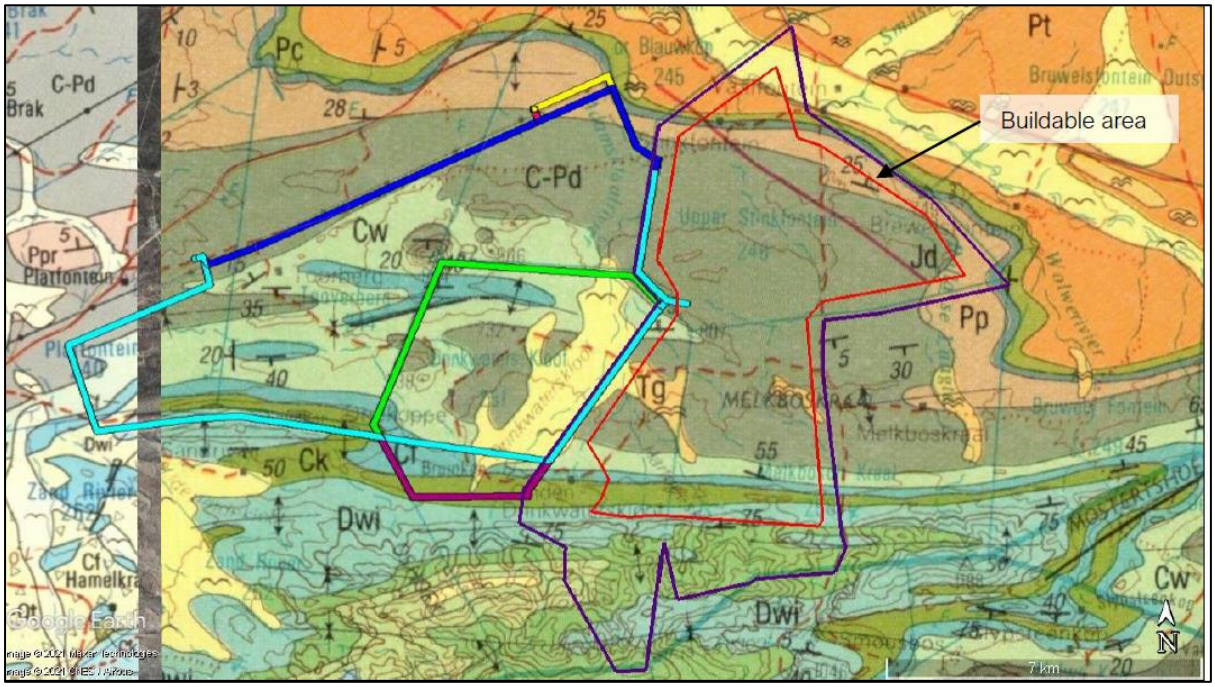


Figure 8: Geology (Extract of 1:250000 scale Geologocial Map 3320 Ladismith - Gage Consulting)

No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. No geologically or geotechnically sensitive areas were

identified within or near the assessment area. It is recommended however that areas of steeper slope gradients are avoided when determining the final infrastructure layout.

9.6 Agricultural

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (November 2022). According to the report, "*Grazing of both sheep and game is the dominant agricultural land use in the area. Grazing capacity of the site is very low at 70 hectares per large stock unit. There is almost no cultivation in the area and what there is, is confined to small, isolated patches of land along water courses"*.

There is only one small isolated patch of land within the application area that is classified as cultivated land and therefore given high agricultural sensitivity. Across the rest of the site, agricultural sensitivity is purely a function of land capability. The land capability of the site on the screening tool is predominantly 5, but varies from 1 to 7. Values of 1 to 5 translate to a low agricultural sensitivity, and values of 6 to 7 translate to a medium agricultural sensitivity.

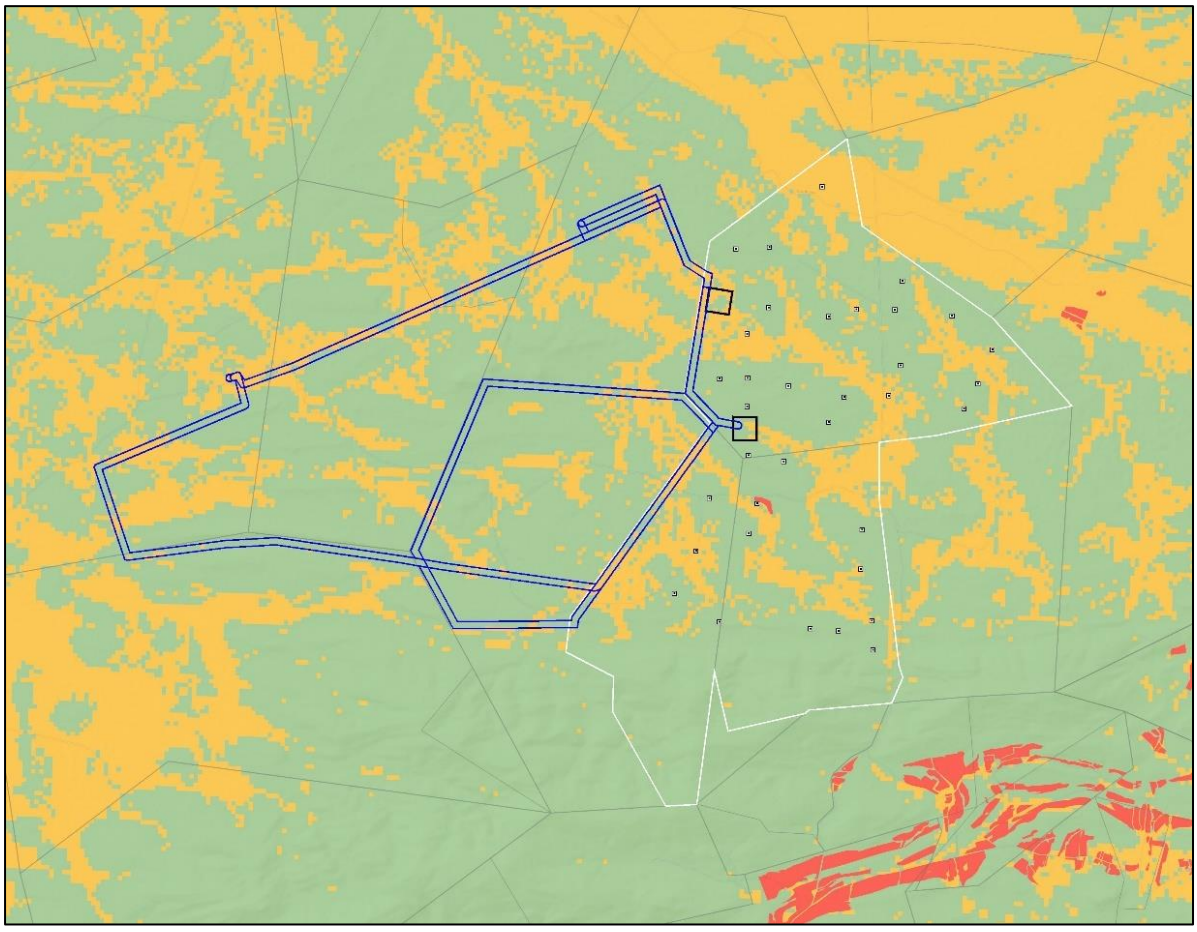


Figure 9: Agricultural sensitivity as given by the screening tool (green = low; yellow/orange = medium; red = high; dark red = very high).

9.7 Geohydrology

A desktop geotechnical report was undertaken by Gage Consulting (Pty) Ltd (October 2020). Accordingly: "*The site is located in the Olifants/Doorn Water Management Area (WMA). The southern portion of the WMA is characterised by fractured bedrock aquifer within which the permanent groundwater table is found at depth.*

The local farmers are reliant on groundwater extraction for farming activities. There are no boreholes that are registered with the Department of Water and Sanitation (DWS) near the site".

9.8 Surface Water

An Aquatic Impact Assessment was undertaken by EnviroSci (Pty) Ltd (June 2022).

According to the assessment, "*The study area contains a variety of aquatic features associated with the region, characterised as follows:*

- *Non perennial rivers alluvial channels with tree dominated vegetation (***Figure 10***) and broad floodplain / alluvial areas associated with the Groot River. These areas are also linked to a defined Vegetation Map vegetation unit namely Tanqua Wash Riviere (Azi 7) and known habitat for the Riverine Rabbit (Discussed in more detail in the Terrestrial assessment).*
- *Non perennial rivers alluvial dominated channels with or without riparian vegetation. These ranged from narrow channels to broad flood plain areas. The mainstem watercourse such as the Adamskraal River and contained elements of a riparian zone. These although not very broad contained several tree and shrub species that stood out from the general landscape, i.e. any sporadic runoff in these systems is able to support larger tree and shrub specimens versus the very low growing vegetation beyond the watercourse (i.e. terrestrial areas).*
- *Minor drainage lines (***Figure 11***), with no obligate aquatic vegetation and were mostly 2 – 8m in width*
- *Dams or weirs with no wetland or aquatic features, although not many of these were located within the study area (***Figure 12***).*

Figure 10: A broad watercourse with defined riparian zone associated with Groot River

Figure 11: Sandy / pebble alluvial channel associated with the tributaries of the Adamskraal River that will be traversed by internal access roads

Figure 12: One of the few artificial impoundments within the study area, with no aquatic species or wetlands associated

*The features listed above, drain the study area in a northly region, forming part of the E22B Quinary Catchment, and forms part of the headwaters of the Doring River, which flows beyond the site (***Figure 13).** *Furthermore, the study area is located within portions of the Great Karoo, Southern Folded Mountains and Western Folded Mountains Ecoregions of the Berg/Olifants Water Management Area. This also pertains to portions of the grid connection options that fall within the E22D quinary catchment, but for the purposes of this report it has been assumed that the cables will span the waterbodies observed, with the towers being placed outside of the delineated systems.*

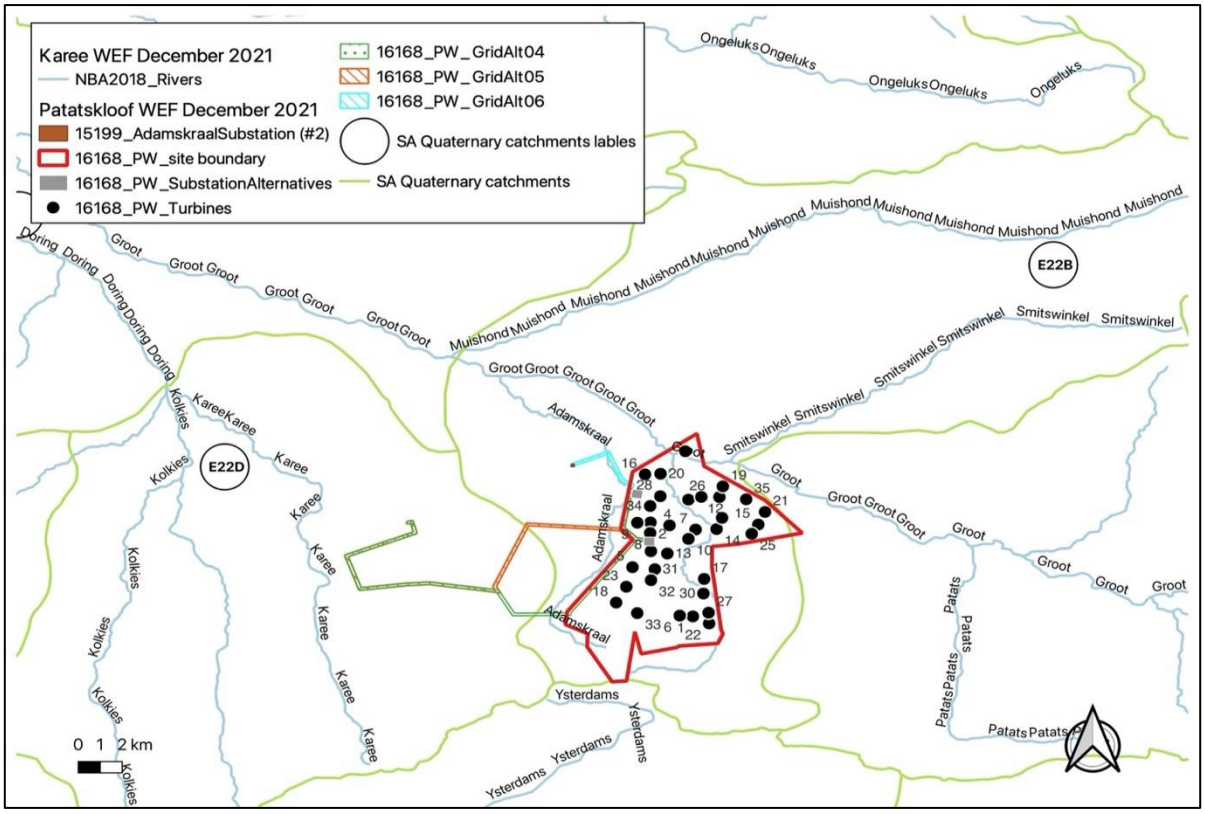


Figure 13: Project locality map indicating the various quinary catchments and mainstem rivers (Source DWS and NGI) within the project boundary

No wetlands were found within the proposed development areas, only the riverine features and those with any riparian thickets were dominated by Vachellia karroo, Searsia lancea, Euclea undulata, Galenia africana, Erianthus capensis, Sporobolus fimbriatus, Cynodon incompletes, Eragrostis curvula, Erharta calcynia, Merxmuellera disticha, and Cynodon dactylon.

Three main natural aquatic systems were observed within the study area, namely the broader non-perennial rivers and the minor drainage lines. The fine scale delineation of the broader systems was focused on for the proposed wind farm infrastructure, to ensure that turbines, buildings and any new internal access roads (as far as possible) avoided these areas. Due to the nature of the landscape, the small drainage lines are unavoidable, but these have also been avoided by the turbines and most of the proposed buildings. This also includes the previously indicated 50m buffer, used in defining the buildable areas shown later in this report (Sensitivity Assessment). The presence of broader Alluvial wash floodplains, as these although carrying water during high rainfall periods are largely colonised by terrestrial species, and also from important potential Riverine Rabbit habitat when accompanied by riverine thicket dominated channels. These systems, which are considered part of the aquatic environment, exhibit little in terms of any functional obligate aquatic habitats and only have water during very high rainfall periods. These systems, although different from the Riverine riparian channels are thus broadly associated with these systems. Both are dominated by sandy silts, but the Riverine riparian areas are dominated by taller stands of Vachellia karroo trees, supported by an understorey dominated by shrubs such as Salsola aphylla, Lycium sp, and Melianthus comosus. The Alluvial Wash Floodplains are mostly barren sandy area, dominated by low growing shrubs such as Salsola and Lycium species mentioned, as well as Pteronia pallens and Eriocephalus ericoides species. Although this habitat type could be rehabilitated easily, the conservation importance based on habitat function resulted in this unit being rated as Very High Sensitivity, represented in its status as a CBA 1.

Substation Option 1 is located within one of the perennial watercourse and within CBA 1, and for this reason should be relocated and or avoided in the alternative selection process. Substation 2 is also located within a delineated system.

Aquatic Sensitivities

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorized into one of number pre-determined sensitivity categories to provide protect and/or guide the layout planning and design processes of the corridor and a suitable alignment for the grid within. Sensitivity areas (with their buffers) were categorized as follows:

Very High = No Go	Legislated "no go" areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile
High	Areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity
Low	Areas of low sensitivity or constraints
Neutral	Unconstrained areas (left blank in mapping)

With regard the aquatic environment, there are no normalized riverine or wetland buffer distances provided by the provincial authorities and as such the buffer model as described Macfarlane & Bredin (2017) for wetlands, rivers and estuaries was used. These buffer models are based on the condition of the waterbody, the state of the remainder of the site, coupled to the type of development, as wells as the proposed alteration of hydrological flows. Based then on the information known for the site the buffer model provided the following:

- Construction period: 50 m
- Operation period: 42 m
- Final: 50 m

Artificial dams were not buffered.

The table below provides an overview of the sensitivity of various features (with buffers distances where relevant) as it relates to the main project component types for the project. The sensitivity ratings of No go, High, Medium and Low were determined through an assessment of the habitat sensitivity and related constraints. However, these No-Go areas relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e., existing road crossings within Very High sensitivity areas) but this is only considered acceptable if these areas have already been impacted.

Results of the sensitivity rating / constraints assessment

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
WTG areas	Alluvial Wash Floodplains with or without riparian vegetation	No-Go with 50m buffer	
	Watercourses with or without channels / riparian vegetation	No-go with 50m buffer	
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	
Hardstands, Buildings / Substations & BESS	Alluvial Wash Floodplains with or without riparian vegetation	No-Go with 50m buffer	
	Watercourses with or without channels / riparian vegetation	No-go with 50m buffer	
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	
Roads	Alluvial Wash Floodplains with or without riparian vegetation	No-Go with 50m buffer No-go with 50m buffer	LOW if an existing crossing / road or impact is already present, that must then be included in the potential road network
	Watercourses with or without channels / riparian vegetation		
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	
Overhead Lines	Alluvial Wash Floodplains with or without riparian vegetation	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated where possible as some of the alluvial system are very broad	
	Watercourses with or without channels / riparian vegetation		
	Artificial dams		

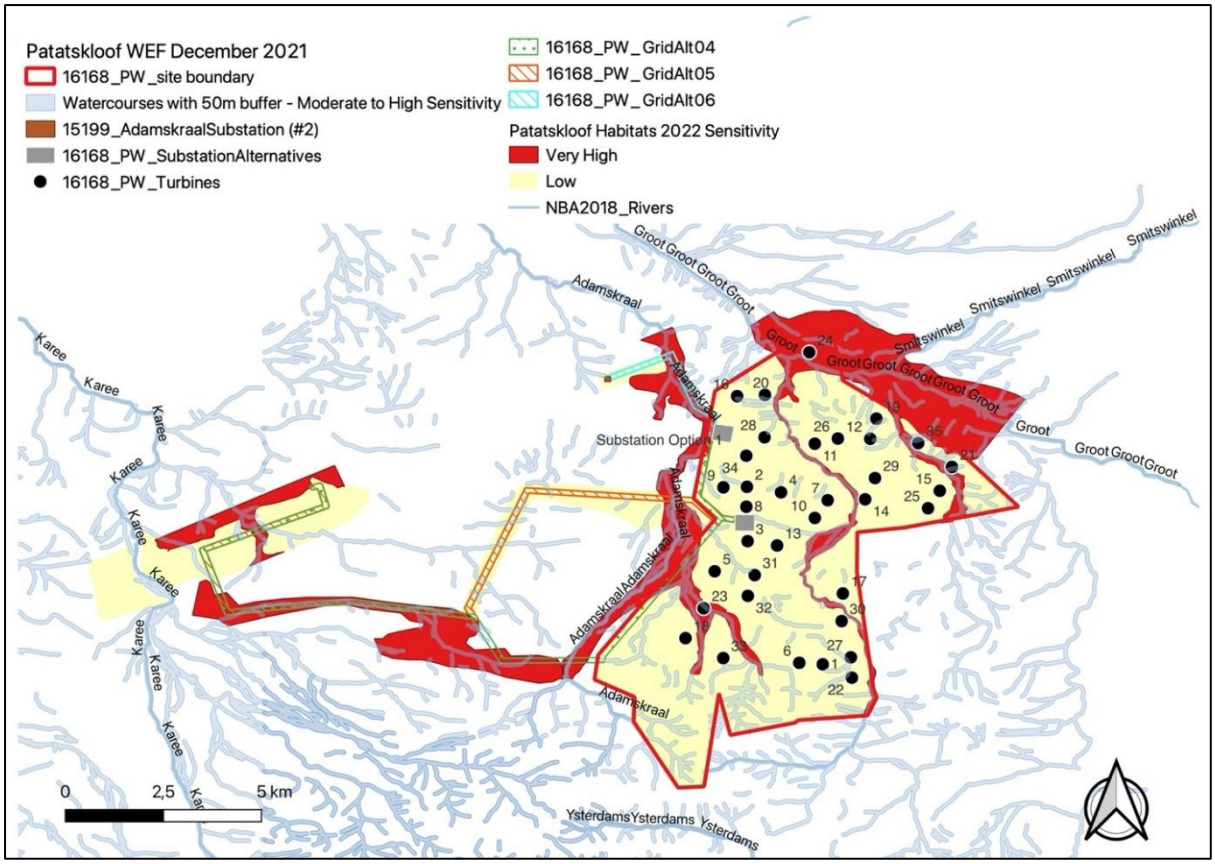


Figure 14: Habitat sensitivity map inclusive of aquatic habitats assessed

A variety of environmental features were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has the potential, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and environmental risk. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance. Lastly no preference is provided with regard the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned, while making use of existing tracks.

9.9 Terrestrial Biodiversity

A Terrestrial Biodiversity Assessment was undertaken by EnviroSci (November 2022).

9.9.1 Vegetation and flora

According to the report, *the species composition clearly followed a gradient from the higher lying areas in the south, with a marked reduction in plant species diversity and abundance in habitats observed in the northern parts of the study area, i.e. the shale dominated areas associated with the Tanqua Karoo vegetation unit was rather depauperate* (**Figure 16**) *when compared to both the Majtiesfontein vegetation units in the south* (**Figure 17**).

Figure 15: A view from the central portion of the site, looking westwards, over the Tanqua Karoo vegetation unit that spans most of the site.

Figure 16: A ground view of the habitat transition within the site, dominated by the sparsely vegetated shale / quartzite plains in the western portion of the site near the grid connection but will be avoided by the proposed grid corridors

Figure 17 therefore represents the finer scale mapping of the habitats/vegetation units found on site and could be summarised as follows:

- *Ruschia quartzites*
- *Tanqua karoo - Pteronia pallens / Zygophyllum shrubland*
- *Renosterveld & Fynbos*
- *Tanqua Wash Riviere (Azi 7)*

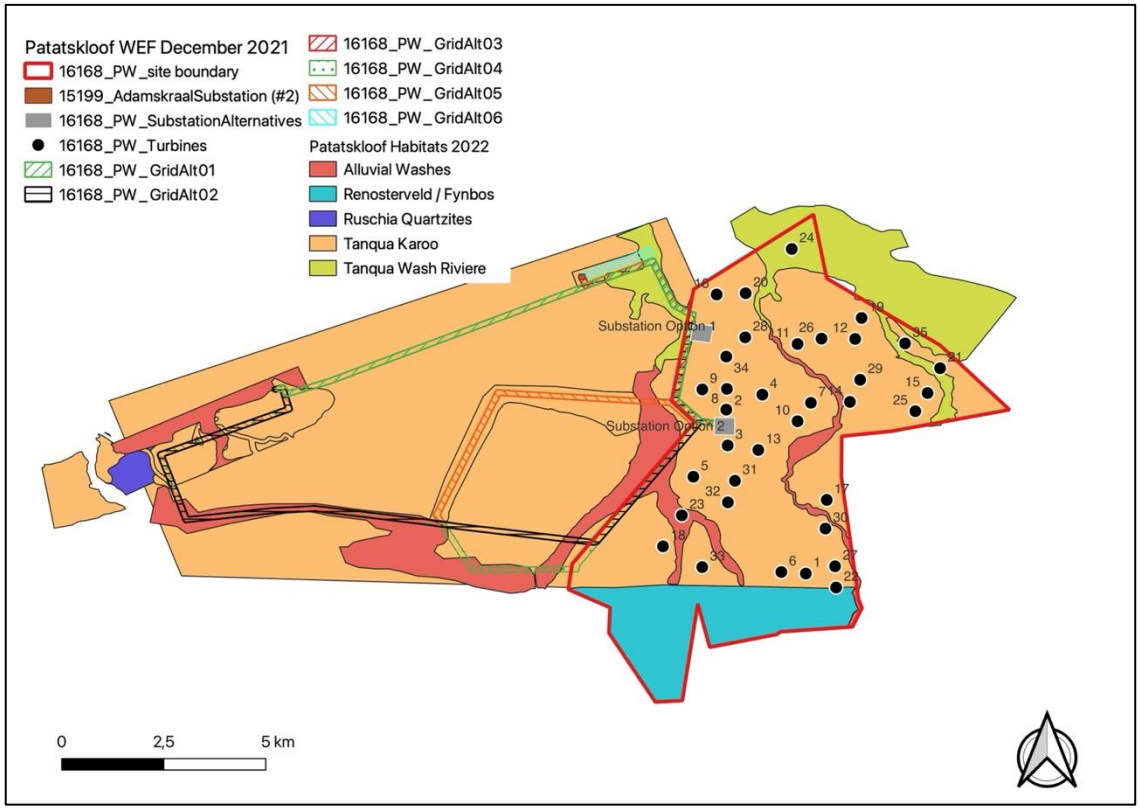


Figure 17: Spatial representation of the observed vegetation units at a finer scale, dominated by three terrestrial habitat units

9.9.2 Fauna

Approximately 179 animal species have been previously observed within the two (2) quarter degrees square areas associated with the study area. These are predominantly Mammal (20%), Reptile (19%) and Insect species (50%), which for the most part highly mobile and or habitat specific. These as listed in the Species Checklist created for the assessment were then searched for during the site visit. The only exception being the fish and amphibian species as no permanent or suitable habitat was observed within the study area, although habitats do occur downstream of the project area.

The DFFE screening tool results only include one important species (High & Medium Sensitivity), namely the Critically Endangered Riverine Rabbit (Bunolagus monticularis). Riverine rabbits are habitat-specific associated with dense patches of riverine bush along seasonal rivers similar to those found downstream of the site (Doring & Groot rivers). The Riverine rabbit is the only indigenous burrowing species in Africa, and thus requires deep, soft alluvial soils. It is therefore important that the Alluvial

Wash Floodplains with riparian areas, which also contain both Lycium and Salsola plant species, a favoured food source for this rabbit, are avoided as far as possible by the proposed development. The Riverine Rabbit has been observed within a 15-20km radius of the site.

In terms of fauna the following are species which potentially occur at the site and are listed as protected species, with those species highlighted in BOLD being observed in this and past assessments:

Schedule 1: Specially Protected Fauna as per the Western Cape Nature Conservation Ordinance (No. 3 of 2000) that may occur within the region or have suitable habitat present:

- *Felis nigripes - Black-footed cat/Miershooptier*
- *Felis silvestris - African wild cat/Afrika wildekat*
- ***Ictonyx striatus - Striped polecat/Stinkmuishond***
- *Mellivora capensis - Honey badger/Ratel*
- ***Otocyon megalotis - Bat-eared fox/Bakoorvos***
- *Proteles cristatus – Aardwolf/Maanhaarjakkals*
- *Vulpes chama - Cape fox / Silver jackal Silwervos*
- *Orycteropus afer - Aardvark / Ant-bear Erdvark / Aardvark*
- *Atelerix frontalis – South African hedgehog*
- *Family: Chamaeleonidae - Chamaeleons, all species*
- *Family: Cordylidae Girdled lizards, all species*

Virtually all indigenous fauna which do not fall under Schedule 1 are classified under Schedule 2, except those species classified as pests. In terms of mammals most rodents, shrews, elephant shrews, bats, hares and rabbits, carnivores such as mongoose, genets, and meerkat, antelope such as klipspringer, steenbok, Mountain reedbuck and duiker are included. In terms of other vertebrates, all tortoises, lizards, most harmless snakes and all frogs are listed under Schedule 2. The full list is contained within the Schedule and it not repeated here.

In terms of fauna, the following, inter alia, are protected and may not be hunted, captured or harmed without a permit:

- *All tortoises [3 species observed which include Angulate tortoise (Chersina angulate - Plate 5), Karoo Padloper (Homopus femoralis) & Southern Tent Tortoise (Psammobates tentorius tentorius)];*
- *All lizards;*
- *All frogs;*
- *Most snakes [4 species have been observed in the past on site, namely Cape cobra (Naja nivea), Mole snake (Pseudoaspis cana), Karoo sand snake (Psammophylax rhombeatus rhombeatus), and Puff adder (Bitis arietans arietans – Plate 6);*
- *All indigenous antelope;*
- *Aardvark;*
- *Most small carnivores such as Honey Badger, Cape Fox, Bat-eared Fox;*
- *Large Grey Mongoose etc.; and*

With the exception of the tortoises, lizards and snakes, the species listed above typically leave the area once construction commences, thus permits for the relocation of lizards, snakes and tortoises must be obtained.

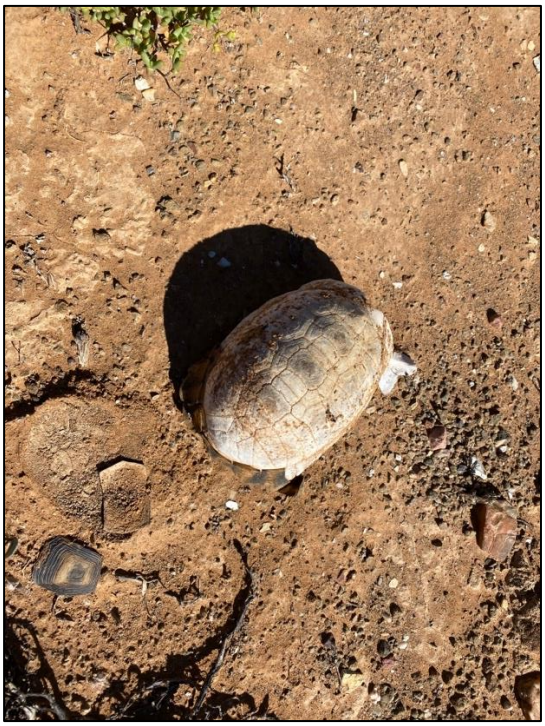


Figure 18: One of the many Angulate tortoises (Chersina angulata) observed on site that had succumbed to the previous drought conditions

Figure 19: Another common siting within the region, namely the Puffadder (Bitis arietans arietans), with two (2) sited during the assessment on site

9.9.3 Critical Biodiversity Areas

The provincial Biodiversity Spatial Plan Critical Biodiversity Area (CBA) spatial layers are shown in the figure below. Noting that the aquatic systems associated with the study area have been rated as Critical Biodiversity Areas Type 1, Ecological Support Areas (Type 1 & 2), associated with aquatic/riverine systems. Substation option 1 is the only other structure (building) that is located with an CBA.

The study area is also not located within an International Bird Area (IBA) or a Strategic Water Resource Area and did not contain any wetland clusters or listed Threatened Ecosystems.

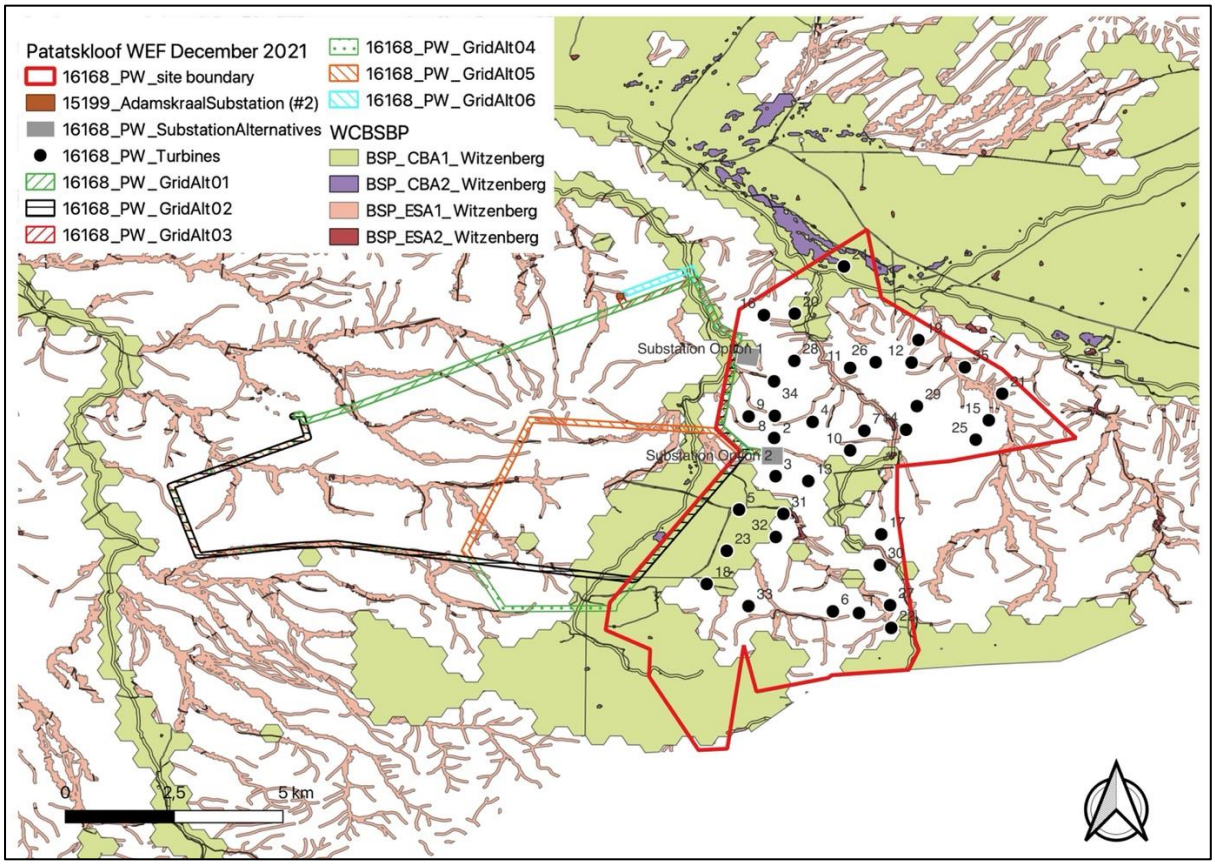


Figure 20: The Critical Biodiversity Areas as per the Western Cape Biodiversity Spatial Plan (2017)

9.9.4 Terrestrial Sensitivities

Using the baseline description and field data while considering the current disturbances and site characteristics, the following features were identified, then categorized into one of number pre-determined sensitivity categories to provide protect and/or guide the layout planning and design processes of the corridor and a suitable alignment for the grid within. Sensitivity areas (with their buffers) were categorized as follows:

Very High = No Go	Legislated “no go” areas or setbacks and areas or features that are considered of such significance that impacting them may be regarded as fatal flaw or strongly influence the project impact significance profile

High	Areas or features that are considered to have a high sensitivity or where project infrastructure would be highly constrained and should be avoided as far as possible. Infrastructure located in these areas are likely to drive up impact significance ratings and mitigations
Medium	Buffer areas and or areas that are deemed to be of medium sensitivity
Low	Areas of low sensitivity or constraints
Neutral	Unconstrained areas (left blank in mapping)

The table below provides an overview of the sensitivity of various features (with buffers distances where relevant) as it relates to the main project component types for the project. The features are shown spatially in Figures 9. The sensitivity ratings of No go, High, Medium and Low were determined through an assessment of the habitat sensitivity and related constraints. However, these No-Go areas relate in general terms to the project and there are areas where encroachment on these areas would occur (i.e., existing road crossings within Very High sensitivity areas) but this is only considered acceptable if these areas have already been impacted.

Table 12: Results of the sensitivity rating / constraints assessment

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
WTG areas	Renosterveld / Fynbos	No-go	
	Tanqua Wash Riviere & Alluvial washes	No-go	
	Shale plains, Tanqua Karoo and Ruschia Quartzites	Low – thus acceptable	
Hardstands, Buildings / Substations & BESS	Renosterveld / Fynbos	No-go	
	Tanqua Wash Riviere & Alluvial washes	No-go	
	Shale plains, Tanqua Karoo and Ruschia Quartzites	Low – thus acceptable	
Roads	Renosterveld / Fynbos	No-go	LOW if an existing tracks / road or impact is already present, that must then be included in the potential road network
	Tanqua Wash Riviere & Alluvial washes	No-go	
	Shale plains, Tanqua Karoo and Ruschia Quartzites	Low – thus acceptable	
Overhead Lines	Renosterveld / Fynbos	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated where possible as some of the alluvial system are very broad. This however may not be achievable for the majority of the proposed grid options – See Section 6 below.	
	Tanqua Wash Riviere & Alluvial washes		
	Shale plains, Tanqua Karoo and Ruschia Quartzites		

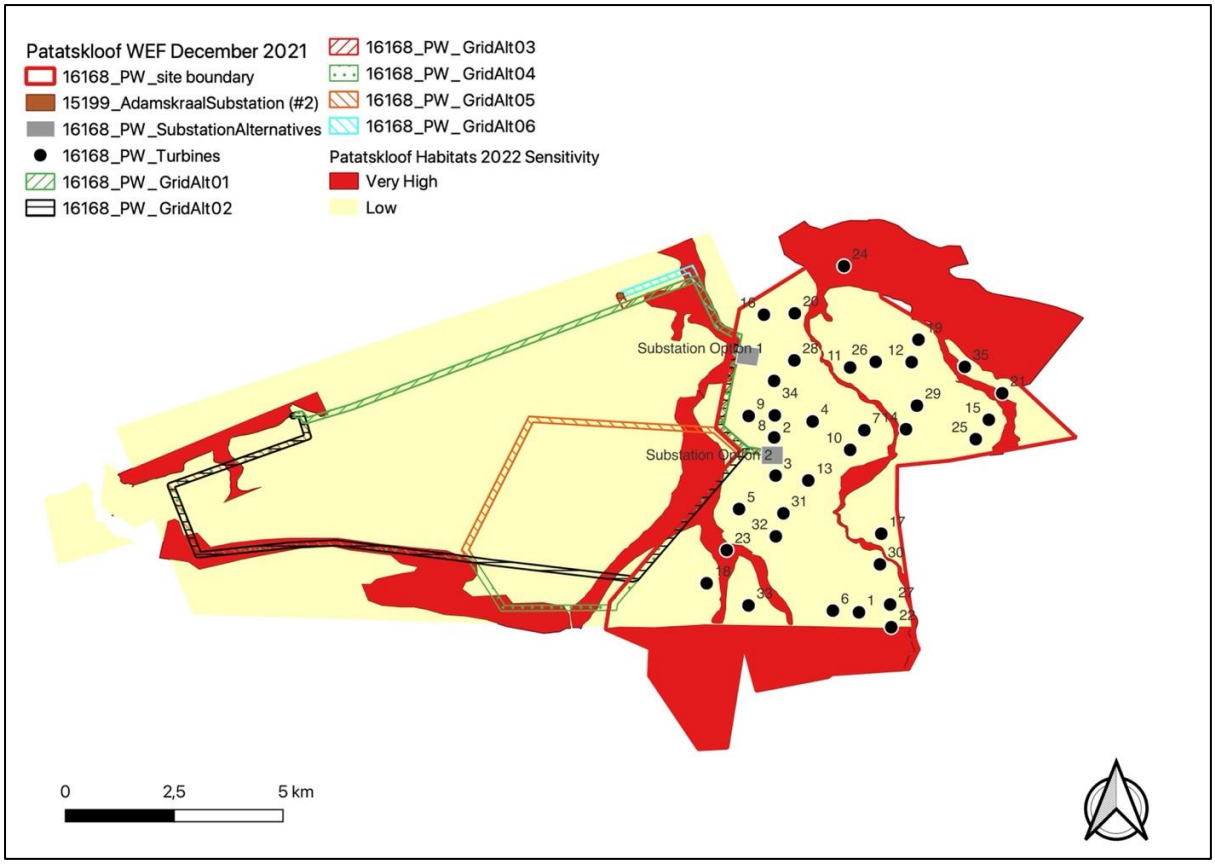


Figure 21: Habitat sensitivity map inclusive of terrestrial and aquatic habitats assessed

9.9.5 Summary of findings

The project overall has a small footprint spread out over a large area, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the wind farm is such that it carries a low intensity impact, but requiring the clearing of areas with terrestrial vegetation, especially when considering the associated roads, cables and other infrastructure.

A variety of environmental features were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has the potential, to a large degree, avoided these sensitive features and buffer areas, greatly reducing the potential overall impact and environmental risk. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance.

Overall, it is expected that the impact on the environment would be Low (-). Noteworthy areas, that should be avoided, include the Very High Sensitivity areas as shown in this report.

9.10 Avifauna

An Avifaunal Assessment was undertaken by Chris van Rooyen Consulting (August 2022). According to the report, *the following avifaunal-relevant anthropogenic habitat modifications were recorded within the PAOI and broader area:*

- *Water points: The land use in the broader area is mostly small stock and game farming. The entire area is divided into grazing camps, with associated boreholes and drinking troughs. In this arid environment, open water is a big draw card for birds which use the open water troughs to bath and drink.*
- *Dams: The PAOI contains a few ground dams located in drainage lines. When these dams fill up after good rains, they contain standing surface water for several months, which attracts birds to bath and drink.*
- *Transmission lines: The Bacchus - Droërivier 1 400kV and Kappa – Muldersvlei 1 400kV transmission lines are located along the north-western boundary of the PAOI. The transmission towers are used by raptors for perching and roosting, and for breeding. A Martial Eagle nest is present on tower 642 of the Droerivier - Kappa 1 transmission line, 8km north-east from the closest proposed turbine location, and approximately 7km from the closest border of the proposed PAOI. The nest has been inactive for the last three years, but it has been occupied by Lanner Falcons on occasion.*

The Cedarberg - Koue Bokkeveld Complex Important Bird Area (IBA) SA101 is the closest IBA and is located approximately 40km north-west of the development areas at its closest point (Marnewick et al. 2015). The development is not expected to have any impact on the avifauna in this IBA due to the distance from the development area.

It is estimated that a total of 135 bird species could potentially occur in the broader area. Of these, 38 are classified as sensitive species for powerlines.

Species name	Scientific name	Full protocol	Ad hoc protocol	Global status	Regional status	Powerline sensitive
African Darter	*Anhinga rufa*	1.23	0.00	-	-	x
African Sacred Ibis	*Threskiornis aethiopicus*	1.23	0.00	-	-	x
African Spoonbill	*Platalea alba*	1.23	1.03	-	-	x
Black Harrier	*Circus maurus*	7.41	6.19	EN	EN	x
Black-chested Snake-Eagle	Circaetus pectoralis	0.00	0.00			x
Black-headed Heron	*Ardea melanocephala*	1.23	0.00	-	-	x
Black-winged Kite	*Elanus caeruleus*	1.23	0.00	-	-	x
Booted Eagle	*Hieraaetus pennatus*	14.81	4.12	-	-	x
Cape Crow	*Corvus capensis*	1.23	0.00	-	-	x
Common Buzzard	*Buteo buteo*	1.23	0.00	-	-	x
Egyptian Goose	*Alopochen aegyptiaca*	13.58	3.09	-	-	x
Great Crested Grebe	*Podiceps cristatus*	0.00	1.03	-	-	x
Greater Kestrel	*Falco rupicoloides*	12.35	3.09	-	-	x
Grey Heron	*Ardea cinerea*	2.47	0.00	-	-	x
Hadada Ibis	*Bostrychia hagedash*	13.58	1.03	-	-	x
Hamerkop	*Scopus umbretta*	1.23	0.00	-	-	x
Helmeted Guineafowl	*Numida meleagris*	2.47	1.03	-	-	x
Jackal Buzzard	*Buteo rufofuscus*	11.11	6.19	-	-	x
Karoo Korhaan	*Eupodotis vigorsii*	12.35	0.00	-	NT	x

Species name	Scientific name	Full protocol	Ad hoc protocol	Global status	Regional status	Powerline sensitive
Lanner Falcon	*Falco biarmicus*	3.70	2.06	-	VU	x
Little Grebe	*Tachybaptus ruficollis*	2.47	0.00	-	-	x
Ludwig's Bustard	*Neotis ludwigii*	7.41	2.06	EN	EN	x
Martial Eagle	*Polemaetus bellicosus*	2.47	1.03	EN	EN	x
Pale Chanting Goshawk	*Melierax canorus*	64.20	34.02	-	-	x
Pied Crow	*Corvus albus*	38.27	12.37	-	-	x
Red-billed Teal	*Anas erythrorhyncha*	1.23	0.00	-	-	x
Red-knobbed Coot	*Fulica cristata*	3.70	1.03	-	-	x
Rock Kestrel	*Falco rupicolus*	16.05	6.19	-	-	x
Secretarybird	*Sagittarius serpentarius*	1.23	0.00	EN	VU	x
South African Shelduck	*Tadorna cana*	11.11	1.03	-	-	x
Southern Black Korhaan	*Afrotis afra*	12.35	5.15	VU	VU	x
Spotted Eagle-Owl	*Bubo africanus*	2.47	1.03	-	-	x
Spur-winged Goose	*Plectropterus gambensis*	1.23	0.00	-	-	x
Verreaux's Eagle	*Aquila verreauxii*	4.94	3.09	-	VU	x
Western Cattle Egret	*Bubulcus ibis*	1.23	0.00	-	-	x
White-breasted Cormorant	*Phalacrocorax lucidus*	0.00	1.03	-	-	x
White-necked Raven	*Corvus albicollis*	13.58	3.09	-	-	x
Yellow-billed Duck	*Anas undulata*	1.23	0.00	-	-	x

The proposed Patatskloof WEF grid connection will have several potential impacts on priority avifauna. These impacts are as follows:

- *Displacement of priority species due to disturbance linked to construction activities in the construction phase.*
- *Displacement due to habitat transformation in the construction phase.*
- *Collisions with the overhead line in the operational phase.*
- *Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase.*

The proposed Patatskloof WEF grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. Out of the six (6) grid corridor alternatives, Corridor Option 3 and Corridor Option 6 are most preferred from an avifaunal perspective.

10. DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT

10.1 Socio economic characteristics

10.1.1Cape Winelands District Municipality

The Cape Winelands District is a land locked municipality and covers an area of 21 472.67 km^2 (approximately 16.6 % of the total Western Cape Province). It borders the following Districts as depicted in **Figure 22**:

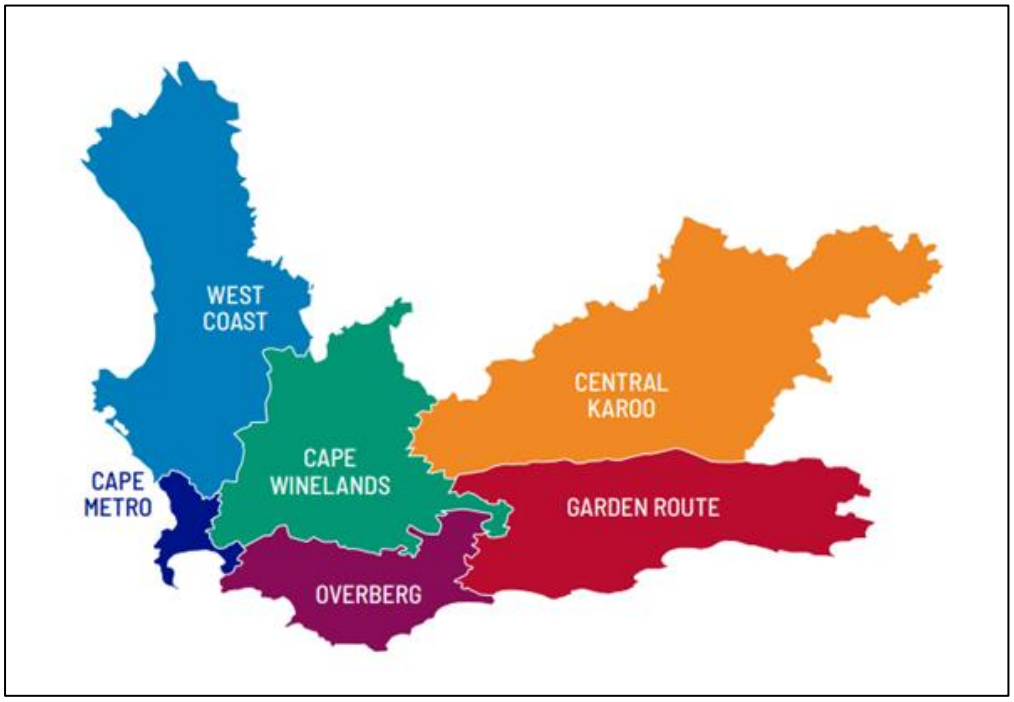


Figure 22: Location of the Cape Winelands District in relation to other District Municipalities (Cape Winelands Integrated Development Plan (IDP), Draft 5th Generation IDP 2022/23 – 2026/27)

The Cape Winelands District incorporates the following local municipalities:

- Breede Valley
- Drakenstein
- Langeberg
- Stellenbosch and
- Witzenberg.

The following towns are also located within the Cape Winelands:

- Ashton
- Franschhoek
- Montagu
- Prince Alfred Hamlet
- Stellenbosch
- Wellington
- Bonnievale
- Gouda
- Op-Die-Berg
- Rawsonville
- Stellenbosch Farms
- Wolseley
- Ceres
- Klapmuts
- Paarl
- Robertson
- Touws River
- Worcester
- De Doorns
- McGregor
- Pniel
- Saron
- Tulbagh

The district is regarded as the premier wine growing area with an ideal microclimate created by the mountains surrounding the towns of Stellenbosch and Franschhoek. The following sectors contribute economically to the district:

- Finance and business services (23.9%)
- Manufacturing (19.6%)
- Wholesale and retail trade (15.2%)
- Agriculture, forestry and fishing (13.1%)
- Transport and communication (9%)
- Construction (4.5%).

The district also attracts a large number of tourists to its wine industry.

With a population of 787 490 people, the Cape Winelands District Municipality has a population density of 36.7/km^2. According to Census, 2011 the district has a sex ratio of 97.2 with 25.8% of the population being under 15 years; 69.0% being between 15 and 65 years and 5.1% being over 65 years of age.

10.1.2 Witzenberg Local Municipality

Witzenberg Local Municipality is situated some 150 km north-east of Cape Town and covering an area of 10 753 km^2. Witzenberg is the largest of the local municipalities within the Cape Winelands district. The vision of the municipality is "*A Municipality that cares for its community, creating growth and opportunities*" (Witzenberg IDP 2022 -2023).

The following towns are within Witzenberg:

- Op-die-Berg
- Prince Alfred Hamlet
- Tulbagh and
- Wolseley.

The municipality also administers the following rural areas:

- Agter-Witzenberg
- The northern portion of the Breede River Valley (Het Land van Waveren)
- Koue Bokkeveld and
- Warm Bokkeveld.

The following economic sectors form the basis of the municipal economy:

- Agriculture, forestry and fishing (29.1%)
- Finance, insurance
- Real estate and business services (22%)
- Manufacturing (16.2%)
- Wholesale and retail trade, catering and accommodation (10%)
- General government (8.4%)
- Transport, storage and communication (8%)
- Community, social and personal services (3.5%).

With a population of 115 946 people the Witzenberg Local Municipality has a population density of 1 078/km^2. According to Census, 2011 the district has a sex ratio of 105.6 with 25.4% of the population being under 15 years; 70.4% being between 15 and 65 years and 4.2% being over 65 years of age.

10.2 Cultural/Historical Environment

10.2.1 Archaeological

An Archaeological Impact Assessment (AIA) was undertaken by PGS Heritage Pty Ltd (November 2022). *A total of 47 sites were identified, consisting of twenty-four (24) Historical Structures (kraals, houses, stonewalling and labourer houses), twenty-one (21) archaeological sites, and two (2) burial ground and graves, that may be affected by the proposed project (***Figure 23***). A background scatter of stone tools (flakes, cores and blades) was observed throughout the project area. As such only sites with a density of 5 or more tools were recorded as sites.*

Thirteen of the sites were observed to be in proximity of the grid alignment options. The sites are PK 17, 18, 19, 20, 22, 24, 41, 46, 47, 16, 15, 14, 07.

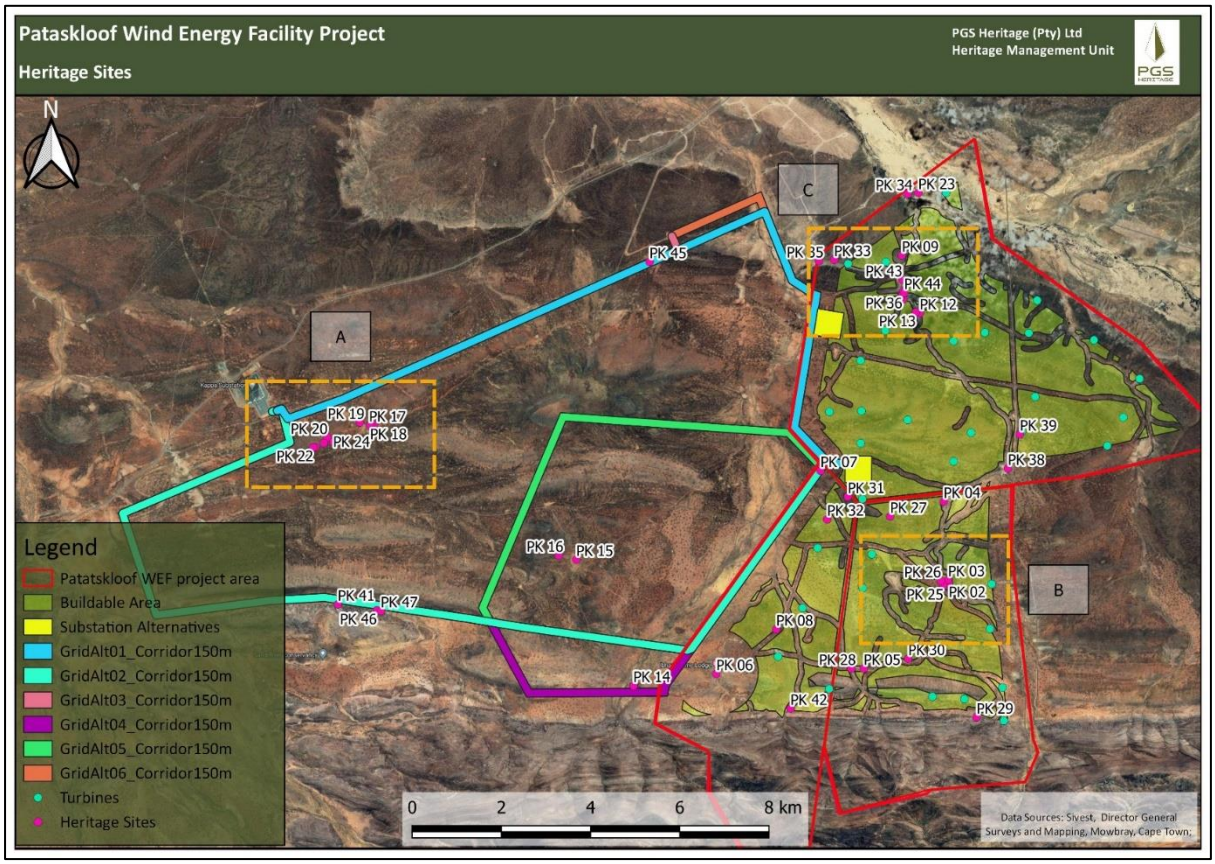


Figure 23: Heritage sites

A description of the heritage sites found in proximity of the grid options is included in the table below:

Table 13: Description of heritage sites in proximity of the grid options

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
PK 07	33.119833	20.123671	A small stone packed circle was observed on the farm Drinkwaterskloof 251. The stone packed shelter was located in the top of a small hill. It most likely functioned as a hunting shelter for the game hunters who visit the Ibhadi Game Lodge during the hunting season. Some cultural material including a bullet casing was observed in the middle of the stone packed shelter. As far has been determined, the site does not have any heritage significance. Thus, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance. It is recommended that: ▪ No mitigation is required.	No research potential or other cultural significance	NCW
 **View of the stone packed hunting shelter. The scale is in 10cm increments.**			 **Bullet casing found in the shelter.**		
PK 14	33.156027	20.085975	The site consists of the ruins of a stone house and kraal. The roof and some sections of the walls of the house have collapsed. A stone packed kraal was located approximately 30 m east of the house. Several sections of the kraal wall have collapsed. A structure was identified near the location of PK 14 on the 3320AA Brewelsfontein topographic map dating to 1969. The construction material (stone, wood and mud) as well as the vernacular elements such as the hearth, chimney and wooden lintels, indicates an age of much older than 60 years. The original roofing was replaced with corrugated iron sheeting. The loss of the roof cover has resulted in a total degradation of the structure. The site has a low heritage significance and grade IIIC. It is recommended that:	Low	IIIC

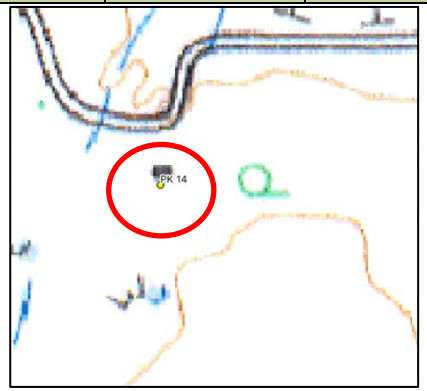
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			▪ A 50-meter buffer around the small farmstead must be kept if any development is to occur in its vicinity.		

View of the stone house from the north. The scale is in 1cm increments.

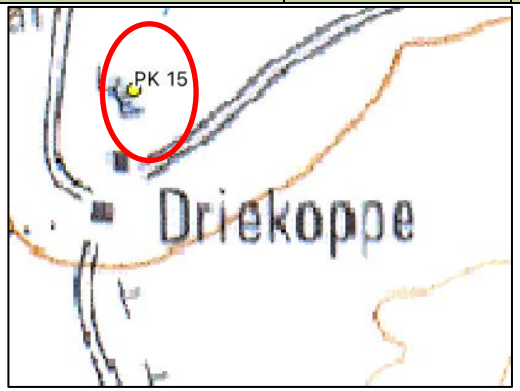
View of the house from the west. The scale is in 1cm increments.

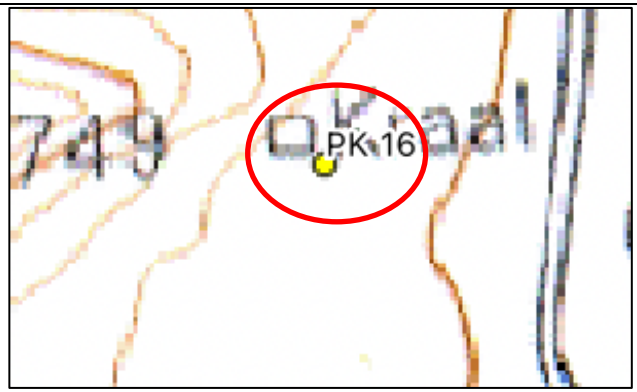
View of the stone kraal, with collapsed walls. The scale is in 10cm increments.

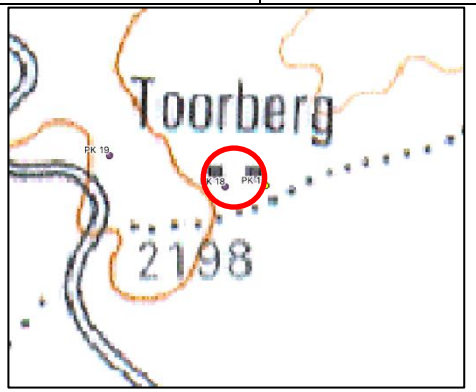
The walls of the kraal are approximately 1m wide in sections. The scale is in 10cm increments.

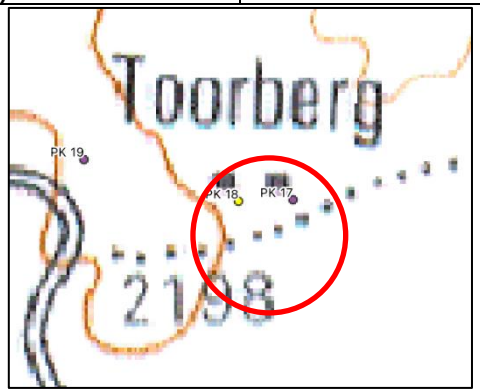
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 **View of the kraal (red circle) identified on 3320AA Brewelsfontein 1969 topographic map near the location of PK 14.**					
PK 15	33.134793	20.074467	The site consists of a farmstead with several buildings, including the main farmhouse, several sheds as well as labourer houses. The original farmhouse and shed is now utilised as storerooms. Two structures were identified near the location of PK 06 on the 3320AA Brewelsfontein topographic map dating to 1969. From the topographic map and architecture, it is suggested that the stone shed as well as one of the labourer houses are older than 60 years old and of heritage significance. The structures are an example of the local vernacular architecture of the region and of heritage significance. The site is provisionally rated as IIIC with medium heritage significance. <u>It is recommended that:</u> ▪ It is recommended that a no-go-buffer-zone of at least 500m from the outer permitter of the farmstead is kept to the closest WEF infrastructure (including turbines, substation facilities and roads).	Medium	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 View of the main house. Photo was taken from the north-west. The scale is in 10cm increments.			 View of the main house. Photo was taken from the south-west. The scale is in 10cm increments.		
 View of a shed and kraal. Photo taken from the west. The scale is in 10cm increments.			 View of a shed and kraal. Photo taken from the south. The scale is in 10cm increments.		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 **View of a goat shed. The scale is in 10cm increments.**			 **View of the two structures (red circle) identified on 3320AA Brewelsfontein 1969 topographic map near the location of PK 15.**		
PK 16	33.134086	20.070923	The site consists of a small stone structure and a stone kraal. The small stone structure is rectangular in shape and is located approximately 12m east of the kraal. The walls and the roof of the structure have collapsed. It was most likely a shelter used by livestock herders. A kraal identified near the location of PK 16 on the 3320AA Brewelsfontein topographic map dating to 1969. The site is provisionally rated as IIIC with low heritage significance. <u>It is recommended that:</u> ▪ If the development does not fall within 50m of **PK 16**, no mitigation is required.	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 View of the small rectangular stone structure. The scale is in 10cm increments.			 View of the kraal. The scale is in 10cm increments.		
 Closer view of the stone packed wall of the kraal. With wooden posts placed at the entrance. The scale is in 10cm increments.			 View of the kraal (red circle) identified on 3320AA Brewelsfontein 1969 topographic map near the location of PK 16.		
PK 17	33.112168	20.033632	Two labourer houses were observed. The house consists of a stone and brick house that has been painted white. The second house consists of a zinc metal structure. A single structure was identified near the location of PK 17 on the 3320AA Brewelsfontein topographic map dating to 1969.	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			From the topographic map and architecture, it is suggested that the stone and brick house could be older than 60 years old. The structures are an example of the local vernacular architecture of the region and of heritage significance. The site is provisionally rated as IIIC with low heritage significance. <u>It is recommended that:</u> ▪ If the development does not fall within 50m of **PK 17**, no mitigation is required.		
 **View of the houses found ta PK 17. The scale is in 10cm increments.**			 **View of a structure (red circle) identified on 3320AA Brewelsfontein 1969 topographic map near the location of PK 17.**		
PK 18	33.112185	20.032906	The site consists of a house. The site is located approximately 50m east of PK 17. The original structure consists of a white stone and brick building. Several additions were added to the east of the original structure. A single structure was identified near the location of PK 17 on the 3320AA Brewelsfontein topographic map dating to 1969. From the topographic map and architecture, it is suggested that sections of the the stone and brick house could be older than 60 years old. The structures are an example of the local vernacular architecture of the region and of heritage significance. The site is provisionally rated as IIIC with low heritage significance. <u>It is recommended that:</u> ▪ If the development does not fall within 50m of **PK 18**, no mitigation is required.	Low	IIIC

<table>
<tr><th>Site number</th><th>Lat</th><th>Lon</th><th>Description</th><th>Heritage Significance</th><th>Heritage Rating</th></tr>
<tr><td colspan="6"> 
View of the original structure (left on the image).
 
View of the other buildings added to the original structure.</td></tr>
<tr><td colspan="6"> 
View of a structure (red circle) identified on 3320AA Brewelsfontein 1969 topographic map near the location of PK 18.</td></tr>
<tr><td>PK 19</td><td>33.111716</td><td>20.030846</td><td>The site consists of a stone packed dam wall.

As far has been determined, the site does not have any heritage significance. Thus, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance.

<u>It is recommended that:</u>
▪ No mitigation is required.</td><td>No research potential or other cultural significance</td><td>NCW</td></tr>
</table>

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 **View of the dam wall at site PK 19.**		
PK 20	33.114256	20.024326	The site consists of a stone kraal. The walls of the kraal are approximately 1.3m high and 0.5m wide. The kraal is approximately 30m x 30m in extent. A smaller kraal approximately 6m x6x in extent is located to the west of the bigger kraal. Two smaller round packed shelters were also observed to the east of the kraal. The stonework and dry stone walling present a unique example of drystone wall craftsmanship A low-density scatters of LSA stone tools were observed near the kraal and could be part of an earlier ephemeral occupation along the low ridge on which the walling occurs. The stone tools consist of flakes and blades and were made form chert and hornfels. The site is provisionally rated as IIIB with a moderate local heritage significance. <u>It is recommended that:</u> ▪ A 50m buffer around the structures of **PK 20** is required.	Moderate	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 View of the kraal at PK 20. The scale is in 10cm increments.			 Closer view of the stone packed wall.		
 View of a smaller kraal located to the west of the bigger kraal. The scale is in 10cm increments.			 Round packed shelter. The scale is in 10cm increments.		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 **Second packed shelter. The scale is in 10cm increments.**		
			  **Several LSA flakes and blades found near PK 20. The scale is in 1cm increments.**		
PK 22	33.115896	20.021461	A second stone cairn was observed on top of a small hill on. It was located approximately 30m west of PK 21. The cairn is approximately 1,3m high and 1m wide. The cairn could be marking the farm boundary or the highest point of the topography of the farm. As far has been determined, the site does not have any archaeological significance but as part of the cultural landscape it presents a layer to the grade IIIA landscape of the area as indicated in the CLA.	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			It is recommended that: ▪ The structure is left in place.		
			 **View of the second cairn. The scale is in 10cm increments.**		
PK 24	33.11496	20.025476	The site consists of a stone kraal. The walls of the kraal are approximately 1.3m high and 0.5m wide. The kraal is approximately 60m x 20m in extent. The stonework and dry stone walling present a unique example of drystone wall craftsmanship The site is provisionally rated as IIIB with a moderate local heritage significance It is recommended that: ▪ A 50m buffer around **PK 24** is required.	Moderate	IIIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 **View of the kraal at PK 24. The scale is in 10cm increments.**		
PK 41	33.142333	20.026433	A medium-density scatter of stone tools was observed on the farm Upper Stinkfontein 246 located on a flat terrace on the side of a hill. The stone tools consist of flakes, cores and blades and were made form chert and hornfels. A scatter of fragmented OES was also found. The site is provisionally rated as IIIB with medium heritage significance. <u>It is recommended that:</u> ▪ If the development does not fall within 50m of **PK 41**, no mitigation is required. ▪ If development occurs within 50m of **PK 41** a Phase 2 survey be conducted, that will include a representative sampling of the assemblages.	Medium	IIIB

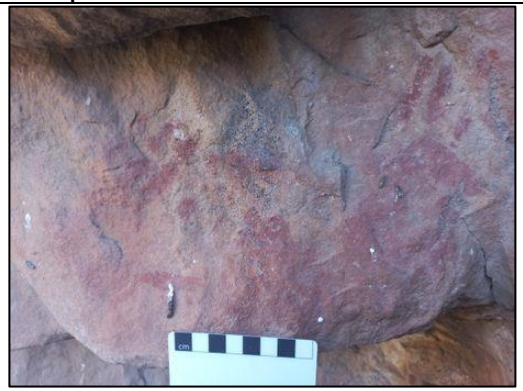
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 General view of the rock shelter at PK 41.			 View of the flat terrace found on site.		
  View of stone tools found. The scale is in 1cm increments.					
PK 46	-33.143339°	20.034257°	The site consists of a rock shelter with rock art. Approximately 10 handprints, in red ochre, are observed across the site. One hippo/cow-like animal as well as a horse, in red ochre, and six antelope, painted in white, are also visible. Several anthropomorphic figures are also visible on the panel. Fragments of thin undecorated ceramics as well as stone tools were observed on the surface of the rock shelter.	High	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			The site most likely dates to the Later Stone Age and Early Historical Period. The site is provisionally rated as IIIA with high heritage significance. <u>It is recommended that:</u> ▪ The site should be demarcated with a 200-meter buffer and should be treated as a No-Go-Zone. ▪ If development occurs within 200m of **PK 46**, the rock shelter will need to be satisfactorily studied and recorded before impact occurs.		

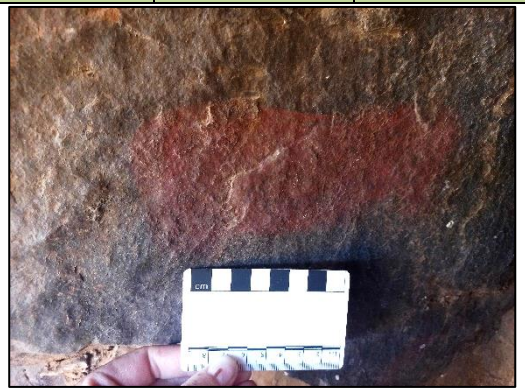
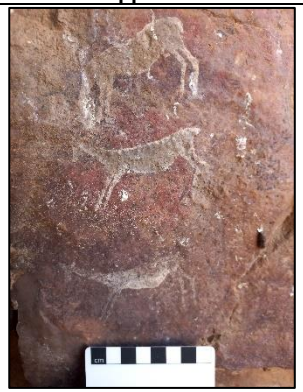
View of the entrance of the north facing Rockshelter.

View of the wall panels in the shelter. The scale is in 10cm increments.

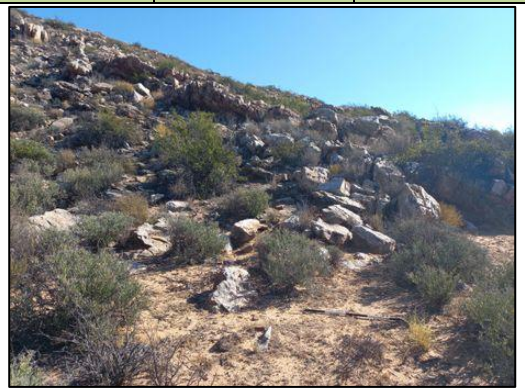
A red handprint on one of the walls. The scale is in 1cm increments



Several red hands and fingerprints. The scale is in 1cm increments

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 Red painted figure of a cow/hippo. The scale is in 1cm increments.			 Red painted figure of a horse. The scale is in 1cm increments		
 White painted antelope. The scale is in 1cm increments.			 Three anthropomorphic figures are painted on the wall. *The scale is in 1cm increments.*		

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 **Some fragmented undecorated thin pottery found in the shelter. *The scale is in 1cm increments.***			 **Stone tools are scattered across the entrance to the rock shelter. The scale is in 1cm increments**		
PK 47	-33.143451	20.035085°	A low-density scatter of stone tools was observed on the foot of a small hill. The stone tools consist of flakes, cores and blades and were made from chert and hornfels. The site is located approximately 80m east of **PK46**. The site is provisionally rated as IIIC with low heritage significance. It is recommended that: ▪ No further mitigation is required	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
 General view of the site.			 Some of the Stone tools are scattered across the surface. The scale is in 1cm increments		
 Several fragmented pieces of OES was observed. The scale is in 1cm increments.					

The impact of the new Patatskloof grid connection infrastructure will be reduced with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. An assessment of the final footprint of the new Patatskloof grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMPr.

The following mitigation measures will be required:

- An archaeological walk down of the final approved layout will be required before construction commences;
- Implement a 50-meter buffer around all structures with a rating of IIIC and higher.
- Implement a 500-meter buffer around the farmstead site at **PK 15**.
- Implement a 200-meter buffer around the rock art sites at **PK 46**.
- Demarcate the resources rated as IIIB-IIIA no-go areas.
- A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.
- A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

10.2.2 Cultural Landscape

A Cultural Landscape Assessment (CLA) was undertaken by Hearth Heritage as part of the Heritage Impact Assessment (April 2022) and indicated the following:

The area proposed for development is located within an undulating Ceres Karoo landscape within which the predominant land use is game grazing. It is a semi-arid region and the vegetation is characteristic of the Succulent Karoo Biome. The area is covered in varying densities of knee high scrub, with tombstone weathered rock outcrops on the elevated areas of the site. Evidence of historic stock management is evident in the various stone kraals located on the site, often on the slopes of the small koppies. An absence of tall trees is noteworthy, with such landscape elements usually associated to cultural activity. The low vegetation accentuates the topography of the landscape, especially areas of elevation such as the Toverberg and Pramberg, which have been used as orientating elements for game and travellers over the landscape through time. There is a farmhouse with some historic elements, as well as a few other historic and modern structures at various stages of use, and numerous farm tracks intersecting the large farm property but the site remains predominantly natural and very isolated. Natural ephemeral streams (currently dry) have cut through the landscape in shallow ravines, with some areas of shallow drainage having allowed for crop cultivation in the past. Various examples of water management through damming and wind pumps are evident on the landscape. Vehicles can be seen traversing the landscape from a distance due to the flat topography and the moving dust columns they create. More recent introductions of the Perdekraal WEFs, the Kappa Substation and other associated electrical grid infrastructure can be found in the general region and directly to the north of the Patatskraal site, which detract from the historic and natural wilderness character of the general region.

The Ceres Karoo region is a significant cultural landscape that reflects the relationship between man and nature over a period of time. This relationship has generally been sustainable, where biodiversity and ecological systems have been maintained in the utilisation of the landscape expressed in specific land use patterns. The surrounding land use indicates a social appreciation of the natural environment with low impact stock and game farming with limited farmstead crop cultivation. The vastness and

relative homogenous nature of the cultural landscape is, however, often undervalued. If careful contextual planning is not followed, it will rapidly result in a cluttered wasteland. This does not mean that development is discouraged, but rather that the implementation of wind and solar energy farms should be planned holistically. It is the duty of the planning department to consider this application in terms of other renewable energy developments that are planned/proposed for the Ceres Karoo area, notably the proposed RE developments included in the cumulative impact section of this report.

Heritage Indicators

The following heritage indicators and development buffers apply to the grid connection:

- *Landscape units D and E are suitable for sensitive WEF infrastructure development;*
- *A 500m buffer to either side of the district road for turbine and infrastructure placement (Patatskloof WEF does not propose turbines or infrastructure within this buffer);*
- *300m buffer to either side of identified significant historic farm roads (pink) for turbine placement, substation and laydown areas;*
- *The historic route (yellow) that passes through Stinkfontein site is no longer in use as such, but should be reinstated as a walking trail and open to public access.*
- *50m outer boundary buffer for roads and infrastructure around farmsteads including cultivated areas and graves – integrity of farmstead complex as a whole should be retained;*
- *200m freestanding graded heritage structure buffer for new roads and infrastructure;*
- *100m buffer from cemetery or unmarked burial for all development;*
- *400m buffer around water management bio-cultural landscape elements (blue circles);*
- *600m buffer around significant Stinkfontein site (orange circle);*
- *existing roads to be used with minimal upgrade as far as possible;*
- *riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archeological) whichever is further (buffers not indicated).*
- *CBA and ESA no-go areas for all development, unless otherwise recommended by the biodiversity and environmental specialist studies for this site;*
- *Pienaarspoort gateway buffer included in the 300m farm road buffer and unit A.*

Further, the following change to the current proposed layout is recommended by the specialist:

- *The substation option 1 and Gridline alternative 3 should be located out of the CBA, without impacting on the riverine corridor flood line and slopes over 3%.*

With these buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Patatskloof WEF and associated grid connection and infrastructure can be reduced from very high to moderate.

There are no fatal flaws and the development can proceed with CLA recommendations and mitigation in place.

10.2.3 Palaeontological

A Palaeontological Impact Assessment (PIA) Report was undertaken Natura Viva cc (April 2022).

According to the report, the Patatskloof grid connection project areas are underlain by several basinal to shallow marine sedimentary formations of the Witteberg Group (Cape Supergroup), Dwyka Group and Ecca Group (Karoo Supergroup) of Palaeozoic age. All these units are potentially fossiliferous but only two – the Early Carboniferous Waaipoort Formation and the Early Permian Whitehill Formation – are generally regarded as of high palaeosensitivty due to their record of well-preserved fish, mesosaurid reptiles, crustaceans and plant fossils in the Tanqua - Ceres Karoo region and elsewhere. A recent 2-day palaeontological field survey shows that the Waaipoort Formation is very poorly exposed within the WEF project area, although potentially fossiliferous phosphatic carbonate concretions do occur here, while the uppermost several meters of the Whitehill Formation are intensely weathered. The only fossil remains recorded during the site visit comprise (a) occasional stromatolitic carbonate erratics within the Dwyka Group and (2) low-diversity, poorly-preserved trace fossil assemblages in the Floriskraal and Collingham Formations. These fossils occur widely within the outcrop areas of the formations concerned and are not of high scientific interest or conservation value. Desktop reviews of several previous palaeontological assessment reports relevant to the grid connection project area show that the bedrocks here are likewise of low palaeosensitivity with no significant fossil sites recorded within the various grid corridors under consideration.

No palaeontological High Sensitivity or No-Go areas have been identified within the grid connection project areas. None of the recorded fossil sites lies within the development footprint as currently defined. Pending the potential discovery of significant new fossil material here during the construction phase, no specialist palaeontological monitoring or mitigation is recommended for these developments.

10.3 Transport

A Transportation Impact Assessment was undertaken by SiVEST SA (Pty) Ltd (November 2022). According to the report, *the development is located in close proximity to an existing road network. A number of existing access points are located along Road OP06121 and in order to accommodate the adjusted land use, the access position will be relocated in order to obtain the recommend sight distances and remove it from its current position. An approval and a wayleave application will be required from the Western Cape Department of Transport & Public Works prior to work commencing. Additional upgrades to the external access road will also be required on Road DR01475 from the adjacent Perdekraal East WEF up to the development on Road OP06121, including the intersection between the two roads.*

The construction phase or Balance of Plant (BoP) phase of this development will typically generate the highest number of additional vehicles. Of these additional vehicles, ±57 trips / hour will occur in the morning and afternoon outside of the peak period, while ±4 trips / hour will occur during the midday peak for construction material and abnormal loads. The impact will however be temporary and are considered to be nominal if adequately mitigated. During the operation phase, it is expected that the facility will accommodate ±30 employees and generate an additional ±10 trips / day in the morning and afternoon peak period. This impact is considered to be nominal.

10.4 Visual

A Visual Impact Assessment was undertaken by SiVEST SA (Pty) Ltd (April 2022). According to the report, *WEF and power line developments are not features of the natural environment, but are rather a representation of human (anthropogenic) alteration. As such, these developments are likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities are practised that are dependent on the enjoyment of, or exposure to, the scenic or aesthetic character of the area. Residents and visitors to these areas could*

perceive the development to be highly incongruous in this context and may regard the development as an unwelcome intrusion which degrades the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. The experience of the viewer is however highly subjective and there are those who may perceive wind turbines as striking elements in an otherwise barren landscape.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a WEF and associated grid connection infrastructure into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

Visual Character

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the sense of place relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

The predominant land use in the area (sheep farming) has not transformed the natural landscape across much of the study area to any significant degree and there are no towns or built-up areas in the study area that significantly influence the overall visual character. Thus there are low levels of human transformation and visual degradation across a significant portion of the study area and the natural character has been retained.

There are however prominent anthropogenic elements in the study area however which include the high voltage power lines, Kappa Substation and Perdekraal East WEF. Other, less prominent elements present in the area include lower voltage power lines, telephone poles, windmills, District Road 1475 and other gravel farm access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF and associated grid connection infrastructure would result in less visual contrast where other anthropogenic elements are already present.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the largely natural landscapes which occur in the wider study area could potentially increase the scenic appeal and visual interest in the area.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be a typical Karoo or "platteland" landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa's dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by widely scattered farmsteads and small towns. Over the last couple of decades, an

increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa's major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the "Getaway Guide to Karoo, Namaqualand and Kalahari" (Moseley and Naude-Moseley, 2008).

Visual Sensitivity

GIS-based visibility analysis was again used to determine which sectors of the grid assessment corridors would be visible to the highest numbers of receptors in the study area. Although sections of the assessment corridors are expected to be visible from most of the identified receptor locations, one section of Corridor Option 5 appears to traverse the steeper slopes of a prominent koppie, thus potentially increasing the visibility of the power line. While this could be seen as an area of potentially high visual sensitivity, given the moderate visual sensitivity rating of the study area as a whole, the sensitivity of the koppie would be reduced to "Medium-High". Hence this is not considered to be a "no go area", but rather should be viewed as a zone where power line development would be least preferred.

In determining visual sensitivity, consideration must also be given to the direct visual impact of the proposed development on any nearby farmsteads or receptors. Accordingly, an additional area of potential visual sensitivity has been delineated around the identified receptor located within 500m of the nearest grid assessment corridor, this being VR3 which is the farmstead located on Remainder of the Farm Zand Rivier No 252. This receptor is inside the assessment corridors for power line Options 2, 4 and 5. As such, this receptor would be subject to high levels of visual impact from these proposed route alignments. The level of impact would however largely depend on the sentiments of the owners/occupants of the farmstead towards the proposed development and this is not known at this stage. As such, a 500 m buffer has been delineated around this receptor as an area of potential visual sensitivity. The areas of visual sensitivity affecting the grid connection infrastructure are shown in the figure below:

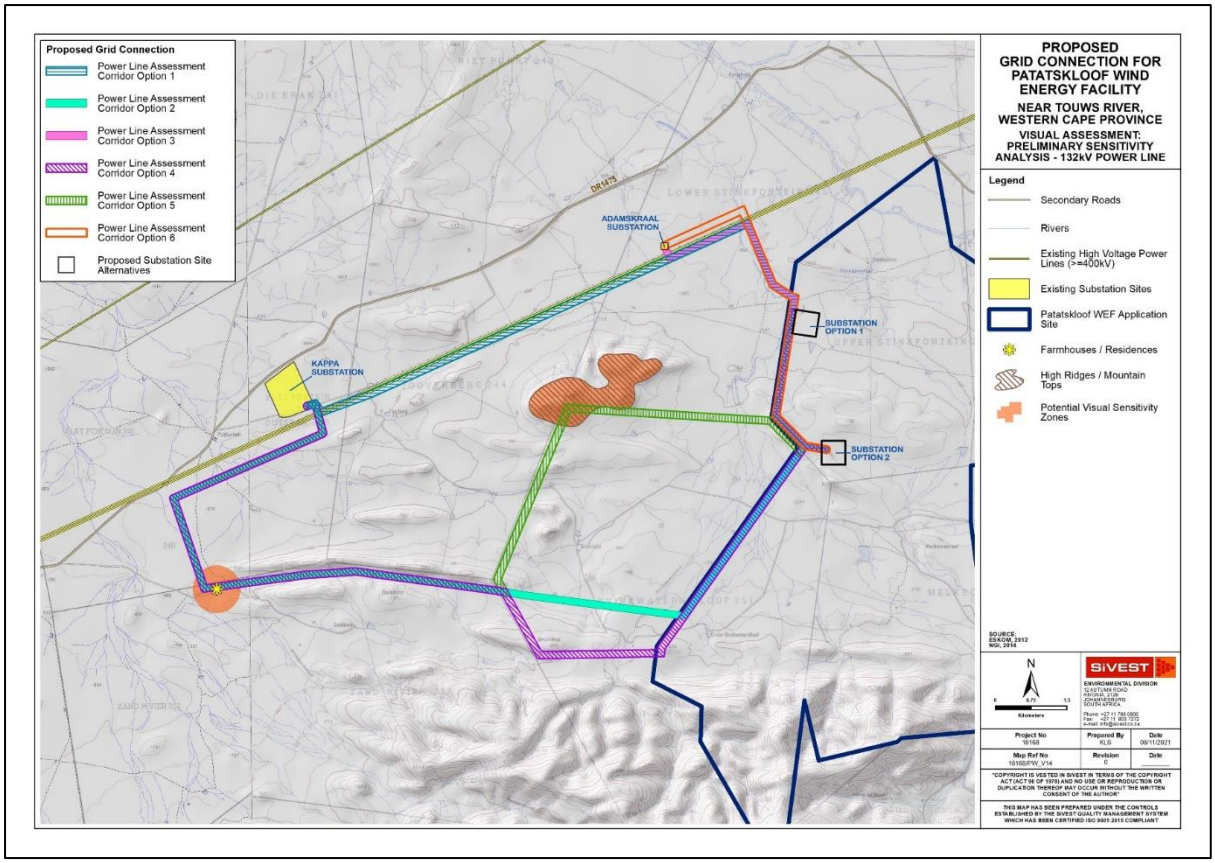


Figure 24: Visual Sensitivity affecting the grid connection

Typical Visual Impacts associated with grid connection infrastructure

Power line towers are by their nature very large objects and thus highly visible. It is understood that the maximum tower height envisaged for the proposed power line is expected to be 25m (approximately equivalent in height to an eight storey building). Although a tower structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the power line comprises a series of towers typically spaced approximately 200m to 400m apart in a linear alignment.

As power lines are not features of the natural environment, they could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the power line. In a largely natural, bushy setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the power line more visible and drawing the viewer's attention to the servitude.

In this instance, the proposed new power line route alignment is expected to be highly incongruous as much of the route is close to existing 400kV power lines. In addition, the grid connection infrastructure is intended to serve the proposed WEF and as such, will only be built if this project is developed. The power lines and substations are therefore likely to be perceived as part of the greater WEF development and the visual impact will be relatively minor when compared to the visual impact associated with the development as a whole.

Substations are generally large, highly visible structures which are more industrial in character than many other components of a WEF. As they are not features of the natural environment, but are representative of human (anthropogenic) alteration, substations will be perceived to be incongruous when placed in largely natural landscapes. Conversely, the presence of other anthropogenic objects associated with the built environment, especially other substations or power lines, may result in the visual environment being considered to be 'degraded' and thus the introduction of a substation into this setting may be less of a visual impact than if there was no existing built infrastructure visible. In this instance, the substation is intended to serve the proposed Patatskloof WEF project and as such, is likely to be perceived as part of the greater WEF development. Thus, the visual impact of the substation will be relatively minor when compared to the visual impact associated with the WEF development as a whole.

11. POLICY AND LEGISLATIVE CONTEXT

The relationship between the project and certain key pieces of environmental legislation is discussed in the subsections to follow.

11.1 The Constitution

The Constitution of the Republic of South Africa, Act 108 of 1996 sets the legal context in which environmental law in South Africa occurs and was formulated. All environmental aspects should be interpreted within the context of the Constitution, National Environmental Management Act 107 of 1998 and the Environment Conservation Act 73 of 1989.

The Constitution has enhanced the status of the environment by virtue of the fact that an environmental right has been established (Section 24) and because other rights created in the Bill of Rights may impact on environmental management through, for example, access to health care, food and water and social security (Section 27). An objective of local government is to provide a safe and healthy environment (Section 152) and public administration must be accountable, transparent and encourage participation (Section 195(1) (e) to (g)).

Section 24 of the Constitution states that:

"Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- To *have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
  - *Prevent pollution and ecological degradation;*
  - *Promote conservation and*
  - *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."*

The Constitution is the overarching legislation for South Africa. Although it provides for certain rights and obligations, the NEMA has been promulgated in order to manage the various spheres of both the social and natural environment.

11.2 National Environmental Management Act (107 of 1998)

The National Environmental Management Act (Act No. 107 of 1998) was promulgated in 1998 but has since been amended on several occasions from this date.

The act intends to provide for:

a) co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
b) institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
c) to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment; and
d) to provide for matters connected therewith.

NEMA is the overarching legislation which governs the BA process and environmental management in South Africa. Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA. Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

According to Section 2(3) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), "development must be socially, environmentally and economically sustainable", which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

The EIA Regulations, 2014 (as amended) identify lists of activities which have the potential to result in detrimental environmental impacts and thus require EA, subject to either "Basic Assessment" or "Scoping and Environmental Impact Assessment". The Regulations prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of EA's.

Activities identified in terms of section 24(2)(a) and (d) of NEMA, which may not commence without environmental authorisation from the competent authority and in respect of which the investigation, assessment and communication of the potential impact of such activities must thus follow the procedure as described in the EIA Regulations. In terms of the EIA Regulations, activities listed in GNR 327 (Listing Notice 1), GNR 325 (Listing Notice 2) and GNR 324 (Listing Notice 3) require EA before they can proceed and be implemented.

The proposed project triggers listed activities under Listing Notice 1, and 3 and thus requires an EA subject to a Basic Assessment (BA) Process. The listed activities are further detailed in Section 7 above.

11.3 Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders (e.g., Eskom, IDC, etc.);
- Private Sector Entities (as project funder / developer / consultant); and
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline seeks to identify activities requiring authorisation prior to commencement of that activity and provide an interface between national EIA Regulations and other legislative requirements of various authorities.

The guidelines are applicable for the construction, installation and/or development of the following renewable energy projects:

- Concentrating Solar Power (CSP) Plant;
- Wind Energy Facility (WEF);
- Hydropower Station; and
- Photovoltaic (PV) Power Plant.

As the proposed development is for electricity distribution infrastructure (namely an on-site substation and powerlines) which will serve the Patatskloof WEF (part of a separate respective BA process), it is subject to the recommendations proposed in the guidelines.

11.4 National Water Act (Act 36 of 1998)

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20th of August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

Water resources as defined include a watercourse, surface water, estuary or aquifer. Specifically, a watercourse is defined as (inter alia):

- A river or spring;
- A natural channel in which water flows regularly or intermittently; and
- A wetland, lake or dam into which, or from which water flows.

Due to the possible encroachment into the wetland areas, the following Section 21 water uses in terms of the NWA may be triggered and require licensing:

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

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. A Surface Water Impact Assessment (**Appendix 6**) has however been conducted to explore how the proposed development may impact on identified water resources as protected by the Act. Should the proposed development require a General Authorisation (GA) or Water Use Licence (WUL), it will be determined and applied for separately prior to construction.

11.5 The National Heritage Resources Act 1999 (25 of 1999)

The National Heritage Resources Act promotes good management of the heritage resources of South Africa which are deemed to have cultural significance and to enable and encourage communities to ensure that these resources are maintained for future generations.

The aim of the Act is to introduce an integrated, three-tier system for the identification, assessment and management of national heritage resources (operating at a national, provincial and local level). This legislation makes provision for a grading system for the evaluation of heritage resources on three levels which broadly coincide with their national, provincial and local significance.

This Act requires investigation to determine the impact of heritage resources when developments exceed the thresholds list in section 38 (1) of the act:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
(b) the construction of a bridge or similar structure exceeding 50 m in length;
(c) any development or other activity which will change the character of a site—
    (i) exceeding 5 000 m^2 in extent; or
    (ii) involving three or more existing erven or subdivisions thereof; or
    (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed development would involve; (a) the construction of a powerline exceeding 300m in length, (c) the development of grid connection infrastructure (substation) that will change the character of more than 0.5ha, and (d), the rezoning of a site that will exceed 1ha.

Under the legislation the South African Heritage Resources Agency (SAHRA), was established, which replaced the National Monuments Council. SAHRA is responsible for the preservation of heritage resources with exceptional qualities of special national significance (Grade I sites). A Provincial Heritage Resources Authority, established in each province, will protect Grade II heritage resources which are significance within the context of a province or region. Buildings and sites of local interest (Grade III sites) is the responsibility of local authorities as part of their planning functions. In this case, the Heritage Western Cape (HWC) will need to be consulted with extensively throughout the process.

A Notice of Intent to develop (NID) was submitted to HWC by PGS Heritage on **30 November 2022.**

Within the scope of this project, Section 38 of the NHRA (25 of 1999), states that, as described above, an assessment of potential heritage resources in the development area needs to be done. A Heritage Impact Assessment (HIA), Archaeological Impact Assessment (AIA), Paleontological Impact Assessment (PIA) and Cultural Landscape Assessment (CLA) has therefore been commissioned to explore how the proposed development may impact on heritage resources and potential cultural artefacts as protected by the Act.

11.6 National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended)

As the principal national act regulating biodiversity protection, the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), which is administered by the DFFE, is concerned with

the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner. The term biodiversity, according to the Convention on Biodiversity (CBD), refers to the variability among living organisms from all sources including, inter alia terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity in genes, species and ecosystems.

The overarching aim of the NEM:BA, within the framework of the NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

In terms of this Act, the developer has a responsibility to:

- Conserve endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations);
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity; and
- Limit further loss of biodiversity and conserve endangered ecosystems.

The South African National Biodiversity Institute (SANBI) was established in terms of the NEM:BA, its purpose being (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems. The NEM:BA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. According to Section 57 of the Act, 'Restricted activities involving listed threatened or protected species':

A Biodiversity Assessment (**Appendix 6**) was undertaken to explore how the proposed development may impact on biodiversity as protected by the Act. Should the proposed development require offsets or permits, it will be determined and applied for separately prior to construction**.** In addition, all relevant conservation departments (such as the SANBI and Cape Nature) will be invited to provide comments with regards to the proposed development.

11.7 National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended)

The overarching aim of the National Environmental Management: Protected Areas Act (NEMPAA) No. 57 of 2003, within the framework of NEMA, is to provide for:

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;

- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The proposed project is not located in close proximity to any protected areas, however it does fall within the National Protected Areas Expansion Strategy area.

11.8 National Forests Act (NFA) (Act No. 84 of 1998)

The National Forest Act (NFA) (Act No. 24 of 1998) was enacted to:

- Provide for the protection, management and utilisation of forests;
- The protection of certain plant and animal life;
- The regulation of trade in forest produce; and
- The control and management of a national hiking way system and National Botanic Gardens.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in GN 908 of 21 November 2014. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

Protected trees
According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'.

Forests
Prohibits the destruction of indigenous trees in any natural forest without a licence.

The NFA is relevant to the proposed development as the removal and/or disturbance and/or clearance of indigenous vegetation will be required and a license in terms of the NFA may be required for this to be done.

A Biodiversity Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on vegetation as protected by the Act. Should the proposed development require offsets or permits, it will be determined and applied for separately prior to construction**.**

In addition, all relevant conservation departments (such as the SANBI and Cape Nature) will be invited to provide comments with regards to the proposed development.

11.9 National Veld and Forest Fire Act (Act No. 101 of 1998)

Provides requirements for veldfire prevention through firebreaks and required measures for firefighting. Chapter 4 of the Act places a duty on landowners to prepare and maintain firebreaks. Chapter 5 of the Act places a duty on all landowners to acquire equipment and have available personnel to fight fires.

11.10 Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) controls the utilisation of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act requires the protection of land against soil erosion and the prevention of water logging and salinization of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

In terms of this Act, no degradation of natural land is permitted. Rehabilitation after disturbance to agricultural land is also managed by this Act. The CARA is relevant to the proposed development as the construction of a solar PV plant as well as other components (such as the on-site switching substation and permanent guard house) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

Declared Weeds and Invaders in South Africa are categorised according to one (1) of the following categories:

- Category 1 plants: are prohibited and must be controlled.
- Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

An Agricultural and Soils Site Verification (**Appendix 6**) has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site. Rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as “any act by means of which the topsoil is disturbed mechanically”. The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the DALRRD. The construction and operation of the facility will therefore not require consent from the DALRRD in terms of this provision of CARA.

11.11 National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended)

The National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended) provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed development.

11.12 Civil Aviation Act (CAA) (Act No. 13 of 2009)

The Civil Aviation Act (CAA) (Act No. 13 of 2009) controls and regulates aviation within South Africa. It provides for the establishment of a South African Civil Aviation Authority (SACAA) and independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention. It gives effect to various conventions related to aircraft offences, civil aviation safety and security, and provides for additional measures directed at more effective control of the safety and security of aircrafts, airports and matters connected thereto.

Although the Act is not directly relevant to the proposed development, it should be considered as the establishment of electricity distribution infrastructure (such as a substation and powerlines) may impact on aviation and air traffic safety, if located directly within aircraft flight paths.

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be consulted throughout the BA process and the required approvals will be obtained, where necessary. It is not however anticipated that any approvals will be required.

11.13 Astronomy Geographic Advantage Act (Act No. 21 of 2007)

The Astronomy Geographic Advantage Act (Act No. 21 of 2007) provides for:

- The preservation and protection of areas that are uniquely suited for optical and radio astronomy; and
- Intergovernmental cooperation and public consultation on matters concerning nationally significant astronomy advantage areas and matters connected therewith.

Under Section 22(1) of the Act, the Minister has the authority to protect the radio frequency spectrum for astronomy observations within a core or central astronomy advantage area. As such, the Minister may under section 23(1) of the Act, declare that no person may undertake certain activities within a core or central Astronomy Advantage Area (AAA). These activities include the construction, expansion or operation; of any fixed radio frequency interference source, facilities for the generation, transmission or distribution of electricity, or any activity capable of causing radio frequency interference or which may detrimentally influence the astronomy and scientific endeavours.

In terms of section 7(1) and 7(2) of this Act, national government established the following AAAs:

- Central Karoo AAA (GN 198 of 2014) – proposed development falls outside this AAA
- Sutherland Central AAA – proposed development falls outside this AAA
- Northern Cape AAA (GN 115 of 2010) – proposed development falls outside of this AAA

Even though the proposed development falls outside the respective AAAs, the relevant authorities, including the Square Kilometre Array (SKA) and South African Large Telescope (SALT), will be consulted throughout the BA process.

11.14 National Energy Act (Act No. 34 of 2008)

South Africa has two (2) acts that direct the planning and development of the country's electricity sector, namely:

i. The National Energy Act of 2008 (Act No. 34 of 2008); and
ii. The Electricity Regulation Act (ERA) of 2006 (Act No. 4 of 2006).

The National Energy Act (Act No. 34 of 2008), promulgated in 2008, has, as one (1) of its key objectives, the promotion of diversity of supply of energy and its sources. From this standpoint, the Act directly references the importance of the renewable energy (RE) sector, with a mention of the solar energy sector included. The aim is to ensure that the South African economy is able to grow and develop, fast-tracking poverty alleviation, through the availability of a sustainable, diverse energy mix. Moreover, the goal is to provide for the increased generation and consumption of RE (Republic of South Africa, 2008).

11.15 Electricity Regulation Act (Act No. 4 of 2006)

In 2011, the electricity regulation on new generation capacity was published under Section 35(4) of the Electricity Regulation Act (ERA) (Act No. 4 of 2006). These regulations apply to the procurement of new generation capacity by organs of state.

The objectives of the regulations include:

- To facilitate planning for the establishment of new generation capacity;
- The regulation of entry by a buyer and a generator into a Power Purchase Agreement (PPA);
- To set minimum standards or requirements for PPAs;
- The facilitation of the full recovery by the buyer of all costs efficiently incurred by it under, or in connection with, a PPA including a reasonable return based on the risks assumed by the buyer thereunder and to ensure transparency and cost reflectivity in the determination of electricity tariffs; and
- The provision of a framework for implementation of an Independent Power Producer (IPP) procurement programme and the relevant agreements concluded.

The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

11.16 Protection of Public Information Act (Act No. 4 of 2013)

The Protection of Public Information Act (Act No. 4 of 2013) (POPIA) recognises the Constitutional requirement that everyone has a right to privacy.

Ultimately the Act promotes "*the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of*

personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this Act and the Promotion of Access to Information Act, 2000 (PAIA); to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate the flow of personal information across the borders of the Republic; and to provide for matters connected therewith".

Due to the requirements around the Public Participation Process, SIVEST will process and capture information aligned to the POPIA and always obtain consent for I&APs information to be gathered, stored and distributed for the purpose of this project.

11.17 Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted[5] Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated strategic transmission corridors6, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

- REDZs for large-scale wind and solar photovoltaic development;
- associated Strategic Transmission Corridors which support areas where long-term electricity grid will be developed;
- process of basic assessment to be followed and reduced decision-making timeframe for processing of applications for environmental authorisation in terms of the NEMA; and
- acceptance of routes which have been pre-negotiated with all landowners as part of applications for environmental authorisations for power lines and substations.

In addition to the eight (8) formally gazetted REDZs mentioned above, the Phase 2 SEA for Wind and Solar Photovoltaic Energy in South Africa (2019) identified three (3) additional REDZs (namely REDZ 9, REDZ 10 and REDZ 11) that are of strategic importance for large scale wind and solar photovoltaic energy development. These REDZs were published under Government Notice No. 786, Government Gazette No. 43528 of 17 July of 2020, and were officially gazetted under Government Notice No. 144, Government Gazette No. 44191 of 26 February 2021[7].

[5] Formally gazetted on 16 February 2018 (Government Notice 114)

[6] Formally gazetted on 16 February 2018 (Government Notice 113)

[7] Formally Gazetted on 26 February 2021 (Government Notice 144)

Table 14: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven (11) geographic areas for REDZs

REDZ Number	Name	Applicability of REDZ
REDZ 1	Overberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 2	Komsberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 3	Cookhouse	Large-scale wind and solar photovoltaic energy facilities
REDZ 4	Stormberg	Large-scale wind and solar photovoltaic energy facilities
REDZ 5	Kimberley	Large-scale solar photovoltaic energy facilities
REDZ 6	Vryburg	Large-scale solar photovoltaic energy facilities
REDZ 7	Upington	Large-scale solar photovoltaic energy facilities
REDZ 8	Springbok	Large-scale wind and solar photovoltaic energy facilities
REDZ 9	Emalahieni	Large scale solar photovoltaic energy facilities
REDZ 10	Klerksdorp	Large scale solar photovoltaic energy facilities
REDZ 11	Beaufort West	Large scale wind and solar photovoltaic energy facilities

According to DFFE *"On the 16 February 2018 Minister Edna Molewa published Government Notice No. 113 in Government Gazette No. 41445 which identified 5 strategic transmission corridors important for the planning of electricity transmission and distribution infrastructure as well as procedure to be followed when applying for environmental authorisation for electricity transmission and distribution expansion when occurring in these corridors"*.

It should be noted that a portion of the proposed development is located within the Central Corridor of the Strategic Transmission Corridors, as defined and in terms of the procedures laid out in Government Gazette No. 41145 and No. 44191[8] Ultimately, the proposed development will be subject to a BA process in terms of the NEMA, as amended, and the EIA Regulations, 2014 (as amended). Since the proposed project falls within one (1) of the Strategic Transmission Corridors, it is expected to contribute towards the requirement of renewable energy highlighted by the development of these zones.

A map of the development in relation to the REDZ and EGI has been included in **Appendix 3**.

11.18 Additional Relevant Legislation

- Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA];
- Environment Conservation Act (Act 73 of 1989) [ECA]
- Road Safety Act (Act No. 93 of 1996) [RSA];
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) [NEM:AQA];
- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended) [NEM;WA];
- Development Facilitation Act (Act No. 67 of 1995) [DFA];
- Promotion of Access to Information Act, (Act No. 2 of 2000); [PAIA]
- The Hazardous Substances Act (Act No. 15 of 1973) [HSA];
- Water Services Act (Act No. 108 of 1998) [WSA];
- Municipal Systems Act (Act No. 32 of 2000) [MSA]; and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

[8] Formally Gazetted on 26 February 2021 (Government Notice 145)

12. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

In his 2021 State of the Nation Address, President Cyril Rhamaposa announced government are taking the following measures to rapidly and significantly increase generation capacity outside of Eskom:

- *One of the priority investment areas is to rapidly expand energy generation capacity.*
- *Restoring Eskom to operational and financial health and accelerating its restructuring process is central to achieving this objective. Eskom has been restructured into three separate entities for generation, transmission and distribution.*
- *A Section 34 Ministerial Determination will be issued shortly to give effect to the Integrated Resource Plan 2019, enabling the development of additional grid capacity from renewable energy, natural gas, hydro power, battery storage and coal.*
- *We will initiate the procurement of emergency power from projects that can deliver electricity into the grid within 3 to 12 months from approval.*
- *The Department of Mineral Resources and Energy gazetted the Amended Schedule 2 of the Electricity Regulation Act 4 of 2006 on 12 August 2021, for 100 Megawatts of embedded electricity generation as approved by Minister Gwede Mantashe.*
- *We will negotiate supplementary power purchase agreements to acquire additional capacity from existing wind and solar plants.*
- *We will also put in place measures to enable municipalities in good financial standing to procure their own power from independent power producers.*

Policy decisions taken in the next decade will largely determine the dimension of the impact of climate change. Local government is in the front line of implementation and service delivery, and thus needs to pursue adequate mitigation and adaptation strategies which should include participation from the public sector, the private sector and NGOs.

The DoE gazetted its White Paper on Renewable Energy in 2003 and introduced it as a 'policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.' At that time, the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa's longer-term energy needs, together with an adequate reserve margin.

The National Development Plan (NDP), 2011 – 2030, aims to address parts of the South African triple development challenges of poverty and inequality by 2030. In order to achieve this, numerous enabling milestones and critical actions have been formulated. One (1) of the critical actions is the formulation and implementation of interventions that aim to ensure environmental sustainability and resilience to future shocks.

The emphasis is on South African investment and assistance in the exploitation of various opportunities for low-carbon energy in the clean energy sources of Southern Africa (National Planning Commission, 2011).

A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission maintains that South Africa has missed a generation of capital investment in many infrastructure opportunities including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20000MW of renewable energy-efficiency (National Planning Commission, 2011).

The proposed project is thus well aligned with the aims of the NDP which is further detailed in the following national and provincial plans:

- National Integrated Resource Plan (IRP) for Electricity (2010-2030);
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended;
- Western Cape Strategic Plan 2019-2024 (refer section 12.1)
- The Western Cape Spatial Development Framework (SDF) 2014 (refer section 12.1.1)
- Cape Winelands District Municipality Integrated Development Plan, 2022/23 – 2026/27 (refer section 12.2)

The proposed project is also well aligned with the Witzenberg Local Municipality IDP (refer section 12.2.1).

12.1 Western Cape Strategic Plan 2019 - 2024

The Western Cape Strategic Plan 2019-2024, highlights the need for energy security and for diversification of the regional energy mix, emphasizing support for the Green Economy and stating that.

"*The growth of the renewable energy sector has the potential for high labour absorption and can also link to increased opportunities for SMMEs, especially for SSEG*" (Western Cape Government, 2020, p. 48).

12.1.1 The Western Cape Spatial Development Framework (SDF) 2014

The proposed project falls within the Western Cape Province. According to the Western Cape Spatial Development Framework (SDF), the Western Cape's energy sources are mostly drawn from the national grid which is dominated by non-renewable sources. According to the SDF, the Province has a small emergent sustainable energy sector in the form of wind and solar generation facilities located in the more rural, sparsely populated areas. One of the key transitions in terms of the Western Cape Infrastructure Framework is to "*Promote the development of renewable energy plants in the Province and associated manufacturing capability*".

The SDF also mentions the challenges around Climate Change and that the focus areas for mitigation are energy efficiency, demand management and renewable energy. Through climate change mitigation they hope to "*encourage and support renewable energy generation at scale*".

The Western Cape Strategic Plan 2019-2024, also highlights the need for energy security and for diversification of the regional energy mix, emphasising support for the Green Economy and stating that: "*The growth of the renewable energy sector has the potential for high labour absorption and can also link to increased opportunities for SMMEs, especially for SSEG*" (Western Cape Government, 2020, p. 48).

12.2 Cape Winelands District Municipality Integrated Development Plan, 2022/23 – 2026/27

Aligned to the provision of a renewable source of energy and provision of economic infrastructure, the Cape Winelands District has identified the following key strategic objectives:

- Creating an environment and forging partnerships that ensure social and economic development of all communities, including the empowerment of the poor in the Cape Winelands District;
- Promoting sustainable infrastructure services and a transport system which fosters social and economic opportunities; and
- Providing effective and efficient financial and strategic support services to the Cape Winelands District Municipality.

In terms project implementations under ***Resource Resilience: Energy Security***, the municipality have initiated the Municipal Energy Resilience (MER) programme which is currently in progress and will be reported on going forward.

All projects, planning initiatives and programmes are implemented within the jurisdiction areas of the applicable local municipality's or district wide, and the following has been included under the Renewable Infrastructure for rural areas:

District Wide Support		
Type of support	**Deliverable**	**Financial Impact**
Renewable Infrastructure – Rural Areas	Solar systems supply to farmers	R1 000 000

12.2.1 Witzenberg Local Municipality Integrated Development Plan (2013 – 2016)

The Witzenberg Local Municipality identifies renewable energy as an opportunity for their municipality. The municipality also forms part of the Komsberg REDZ and they mentione that any projects or renewable energy developments in the municipal area should preferably be located inside of this boundary, however, proposals for renewable energy developments outside of this boundary will be considered on a case by case basis based on its own merits.

Witzenberg has also developed "*a Small-scale Embedded Generaton (SSEG) plan that will support the management of renewable energy producton in the municipal jurisdiction*".

13. NEED AND DESIRABILITY

According to the South African Wind Energy Association (SAWEA), 2022, South Africa's Utility Scale Wind & Renewable Energy Industry: Key Data as of October 2020 is as follows:

National Development Plan: Vision 2030

By 2030, South Africa's transition to an environmentally sustainable, climate-change resilient, low-carbon economy and just society will be well under way:

Wind Industry

- *Integrated Resource Plan 2019 (IRP 2019) released in October 2019 with a wind allocation of 14.4 GW determined up to 2030.*
- *Technology price developments and steep downward price trends contributed to make wind even more competitive.*
- *Due to its value proposition, wind power has taken a larger share of the planned renewable energy (RE) investments to date.*
- *The IRP 2019 is the national electricity infrastructure development plan which is based on least-cost electricity supply and demand balance, considering security of supply and the environment, the aim is to minimize negative emissions and water usage in the generation of electricity.*
- *The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030.*
- *Wind technology has attracted significant investment for the development of projects in the country. The total investment (total project costs), of all projects under construction and projects in the process of closure, is R209.7 billion of which R80.6 billion is for onshore wind Independent Power Producers (IPPs).*
- *IPP-Office (IPP-O) commits to commencing the 5th Bid Window by December 2020 or during the first quarter of 2021.*
- *Risk Mitigation Independent Power Producer Procurement Programme (RMIPPP) 2000MW technology agnostic Request for Proposal issued in 2020. The 2000MW should be live by December 2021.*
- *The active wind IPPs have committed to create 11358 job year opportunities for SA citizens during the construction phase.*
- *The 22 wind IPPs that have successfully reached commercial operations to date have reported 2723 job years for SA citizens.*
- *23 projects with a capacity of 2026MW were scheduled to have reached commercial operations, by the end of March 2020. Actual achievement has been 22 projects delivering 1980MW (98% of the scheduled plan and a shortfall of 47MW)*
- *Over a 12-month period which ended in March 2020 the operational wind projects have reduced CO2 emissions by 6.4Mtons which already 53% of the total 12.1Mtons annual P50 projection for wind IPPs.*

This growing demand, fuelled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. Despite the worldwide concern regarding Greenhouse Gas (GHG) emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the countries renewable energy resources remain largely untapped (DME, 2003). There is therefore an increasing need to establish a new source of generating power in SA within the next decade.

The use of renewable energy technologies, as a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. According to SAWEA (2022): "*It is envisaged that by 2030, the electricity generation mix is set to comprise of:*

- *33364MW (42.6%) coal,*
- *17742MW (22.7%) wind,*
- *8288MW (10.6%) solar photovoltaic (PV),*

- *6830MW (8.7%) gas or diesel,*
- *5000MW (6.4%) energy storage, 4600MW (5.9%) hydro,*
- *1860MW (2.4%) nuclear and;*
- *600MW (0.8%) concentrating solar power (CSP).*

It must be remembered that wind energy is plentiful, renewable, widely distributed, and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

The REIPPP programme and the competitive nature of the bidding process has resulted in significant lowering of solar and wind tariff prices since 2011. Further projects will increase the competitive nature of the REIPPP programme and further result in cost savings to South African consumers.

The proposed Patatskloof Grid is being prepared to participate in the Department of Mineral Resources and Energy Independent Power Producer Procurement Programme (REIPPPP) as well as potential bilateral offtake agreements.

13.1 National Renewable Energy Commitment

In support of the need to find solutions for the current electricity shortages, the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources, South Africa has embarked on an infrastructure growth programme supported by various government initiatives. These include the National Development Plan (NDP), the Presidential Infrastructure Coordinating Commission (PICC), the DoE's IRP, the National Strategy for Sustainable Development, the National Climate Change Response White Paper, the Presidency of the Republic of South Africa's Medium-Term Framework, and the National Treasury's Carbon Tax Policy Paper.

The Government's commitment to growing the renewable energy industry in South Africa is also supported by the White Paper on Renewable Energy (2003) which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa. In order to achieve the long term goal of achieving a sustainable renewable energy industry, the DoE has set a target of contributing 17,8GW of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also through biomass and small scale hydro (DME, 2003; IRP, 2010). Further renewable energy targets have been proposed within the latest IRP, which was gazetted in 2019.

According to the latest IRP (2019): "*Since the promulgated IRP 2010–2030, the following capacity developments have taken place:*

- *A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured, with 3 876 MW operational and made available to the grid.*
- *In addition IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.*
- *Under the Eskom build programme, the following capacity has been commissioned: 1 332 MW of Ingula pumped storage, 1 588 MW of Medupi, 800 MW of Kusile and 100 MW of Sere Wind Farm.*
- *In total, 18 000MW of new generation capacity has been committed to.*

Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing

plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP…"

13.2 Wind Power Potential in South Africa and Internationally

Onshore wind energy technology is the most commonly used and commercially developed renewable energy technology in South Africa (DEA Guideline for Renewable Energy, 2015). *South Africa has fair wind potential, especially along the coastal areas of Western and Eastern Cape*. (http://www.energy.gov.za/). South Africa Wind energy is one (1) of the lowest-priced renewable energy sources and is economically competitive (www.wasaproject.info).

According to the Global Wind Energy Council, 2021 : "*South Africa installed 515 MW of new wind power capacity in 2020, making it the number one market for new annual installations last year as well as for cumulative installations… and Tapping into the region's wind power potential will be crucial to create greater energy security, reduce costs, and generate local socioeconomic benefits*."

13.3 Site Suitability

The proposed substation and power line development will serve the Patatskloof WEF and once fully developed, the intention is to feed the electricity generated by the above-mentioned WEF project into the national grid.

Several key aspects played a role in determining the location of the proposed Patatskloof WEF ,Battery Energy Storage System (BESS) and shared 33/132kV on-site substation (seperate application) and associated 132kV Power Line development (this application) such as resource, grid availability and capacity, environmental, competition, topography and access.

1. **Resource:** Wind resource is one of the main driver's wind project viability across South Africa. The applicant has investigated the option of solar energy however, the applicant has preferred the wind energy option.
2. **Grid Availability and Grid Capacity:** The primary driver of site selection is capacity on the local transmission system to evacuate the power into the national grid. The presence of the Kappa Main Transmission Substation and Adamskraal Substation to which the Eskom portion (132kv portion/yard of the shared 33kv/132kv of the Patatskloof WEF will connect facilitates this evacuation process. The Patatskloof WEF on-site substation will be a step-up substation and will include an Independent Power Producer (IPP) portion (33kv portion/yard of the shared 33/132kv onsite substation) and an Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation – this portion will be ceded to Eskom once the onsite substation is constructed and the necessary transfer of rights undertaken), hence the IPP portion (33kv portion/yard of the shared 33/132kv onsite substation) has been included in the WEF BA process and the Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation) and associated 132kv overhead line, included in grid connection infrastructure BA process (i.e. this application). This will facilitate an ease of transfer over to Eskom once the onsite substation is constructed.
3. **Environmental:** Environmental suitability plays a key role when identifying Project Sites / Proposed Developments. The Project Sites are micro-sited in terms of environmental sensitivities and a suitable development area identified. Thus, the development area proposed avoids sensitive environmental areas ensuring the development has the least possible impact on the land on which it will be built.

4. **Competition**: Existing / Proposed WEF within close proximity to the proposed development also needs to be considered as this may have wake loss impacts on the WEF as well grid capacity constraints.
5. **Topography**: Suitable topography needs to be considered especially for the transportation and installation of large wind turbine generators. The site proposed for the Patatskloof WEF development is located in the scenic Karoo region of the Western Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the immediate vicinity of the site is however characterised by flat to gently undulating plains interspersed with areas of localised hills and Koppies. Areas of greater relief occur to the south and east of the study area in the form of the Bontberg and Roggeveld ranges characterised by incised valleys and the flatter, higher lying plateaus with steep slopes.
6. **Access**: Access is an important contributor to site selection. This will have both an environmental and financial impact on the proposed development. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 WCG provincial Roads.
7. **Other**: Other key criteria which refines the site selection on a micro level.

13.4 Reduced dependency on fossil fuels

According to the South African Energy Report 2019, "*The South African energy supply is dominated by coal which constituted 69% of the primary energy supply in 2016, followed by crude oil with 14% and renewables with 11%. Nuclear contributed 3% while natural gas contributed 3% to the total primary supply during the same period*". Apart from the fact that fossil fuels are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. During combustion, fossil fuels such as coal emit many by-products into the atmosphere, two (2) of which are carbon dioxide (CO_2) and sulphur dioxide (SO_2). Both these gases have been shown to contribute to the worsening climate crisis. Wind is a free and infinite resource that occurs naturally in the environment. Converting wind energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

13.5 Stimulate the economy

A significant portion of the capital expenditure envisaged for the project will be spent on procurement of goods and services within South Africa and specifically within the Western Cape Province. If goods and services are procured locally (i.e. within South Africa), it increases the production of the respective industries. This has a positive impact on the national economy and economies of the municipalities where inputs are procured.

The proposed development has the potential to stimulate the demand for other industries, among others construction services, engineering service, transport services, steel structures, cement and other aggregates, and electrical equipment. At the local level, increase in demand for accommodation, personal services, perishable and non-perishable goods is expected, which will stimulate the local economies of the towns and settlements, where labour will be procured from or where migrant workers will be temporarily located.

Some of the local businesses could benefit from sub-contracting opportunities, if the construction companies appointed by the developer implement a local community procurement policy, and consumer expenditure of the construction crew. Furthermore, the demand for hospitality services (including accommodation and catering in the towns Touws River and other nearby towns) is expected to increase and provide for much-needed stimulus for the local economy.

According to the Social Impact Assessment (May 2022), *"The project will also stimulate the local economy, which is likely to be most significant at a cumulative level. There will be a significant economic contribution attached to the project. This contribution will be in the form of disposable salaries and the purchases of services and supplies from the local communities in and around the Touws River and Matjiesfontein area. The capital expenditure (CAPEX) during construction is estimated at R1 billion, with the operational phase estimated at 3% of CAPEX.*

*Apart from job creation and procurement spend, the project will also have broader positive socio-economic benefits, at a national level, regarding the potential to contribute towards the National Grid requirements as part of the Government's vision to source 22.53% of the country's energy through wind power by 2030**Invalid source specified.**".*

13.6 Job opportunities and household livelihoods

WEF and associated grids connection projects create both temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. According to the Social Impact Assessment that was undertaken (2022), the project will lead to the creation of both direct and indirect jobs which will have a positive economic benefit within the region. In this regard, the proposed development is anticipated to provide approximately 400 jobs during the construction phase, 300 low skilled, 100 skilled. A total of 12 jobs will be created in the operational phase, 6 skilled and 6 low skilled. Many of the low and semi-skilled employment opportunities will probably be available to residents in the area, specifically residents from Witzenberg. Many of the beneficiaries are likely to be historically disadvantaged members of the community and the project will provide opportunities to develop skills amongst these people.

In addition to those benefitting from direct employment created at the project, various multiplier effects will assist in temporarily supporting existing jobs in the businesses offering services and goods that will be procured during construction activities. The increased temporary income earned by these businesses will, in turn, stimulate consumer spending, creating another round of multiplier effect, positively impacting on the employment situation in the area.

There are 2 275 households within Ward 12 of the Witzenberg Local Municipality, of which 13.1% live within informal dwellings; 9.5% of dwellings are fully owned or are being paid off and 49% are occupied rent free. The average annual household income of the ward is R29 400. Of these households, 42.5% receive water from a regional or local service provider; 92% have access to flush or chemical toilets; 39.9% are receiving a refuse disposal service from a local authority or private company, while 45% utilise their own refuse dump.

In 2011, 63% of the population was employed, of which 33% was employed within the informal and 63% within the formal sectors.

13.7 Skills development

In addition to the job creation, there is valuable opportunities for skills enhancement and knowledge transfer as quite often input from experts are required in this field. Therefore, opportunities for guiding and training of local workers is created. A variation of skill sets is required ranging from semi-skilled construction workers to highly skilled engineers. The skill set of the majority of the municipality's residents comprises of low-skills, which means that with proper planning and recruitment strategies, many of the local unemployed residents could be hired as temporary construction workers on site provided they satisfy any other recruitment criteria.

Those employed will either develop new skills or enhance current skills. This insinuates that inexperienced workers will have the opportunity to attain and develop new skills, while experienced workers will further improve their existing skills. Albeit the employment is temporary, the skills attained will be of long-term benefit to employees. However, as any skills set it will need to be supported and practised on a regular basis to maintain its currency.

13.8 Proximity to substation

The area is well situated, as described above, with good wind resources suitable for the installation of a large WEF. In addition to this, the project area is in close proximity to connectivity opportunities. The surrounding area is not densely populated and should therefore not impact on people's livelihoods living in the area.

Grid connection suitability, or capacity on the local transmission system to evacuate the power into the municipal electricity grid, is one of the primary drivers which assists in choosing the project location. Long connection lines have increased environmental impacts as well as add increased costs to the proposed development. The proposed development site has good grid connection potential and this thereby minimises the need for an extensive grid network upgrade or long power line. The furthest proposed powerline option is 25km.

14. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION

14.1 Details of alternatives

14.1.1 Introduction

As per the 2014 EIA Regulations (as amended), feasible and reasonable alternatives are required to be considered during the BA process. Alternatives are defined in Chapter 1 of the 2014 EIA Regulations (as amended) as "different means of meeting the general purpose and requirements of the activity". These alternatives may include:

(a) The property on which or location where it is proposed to undertake the activity;
(b) The type of activity to be undertaken;
(c) The design or layout of the activity;
(d) The technology to be used in the activity;
(e) The operational aspects of the activity; and
(f) The option of not implementing the activity.

Each of the alternatives in relation to the proposed development is discussed in the sections below.

14.1.2 Location/Site alternatives

As previously mentioned, several key aspects played a role in determining the location of the proposed Patatskloof WEF ,Battery Energy Storage System (BESS) and shared 33/132kV on-site substation and associated 132kV Power Line development. These include resource, grid availability and capacity, environmental, competition, topography and access.

The Project Sites are micro-sited in terms of environmental sensitivities and a suitable development area identified. Thus, the development area proposed avoids sensitive environmental areas ensuring the development has the least possible impact on the land on which it will be built.

Two (2) locations of the proposed 33/132kv shared on-site substation are considered. The on-site substation will be a step-up substation and will include an Independent Power Producer (IPP) portion (33kv portion/yard of the shared 33/132kv onsite substation) and an Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation – this portion will be ceded to Eskom once the onsite substation is constructed and the necessary transfer of rights undertaken), hence the IPP portion (33kv portion/yard of the shared 33/132kv onsite substation) has been included in the WEF BA process (i.e. a separate application) and the Eskom portion (132kv portion/yard of the shared 33kv/132kv onsite substation) and associated 132kv overhead line, included in the grid connection infrastructure BA process (this application). This will facilitate an ease of transfer over to Eskom once the onsite substation is constructed.

Two (2) options have been identified for the 33kv portion/yard of the shared 33/132kV onsite substation:

Six (6) grid corridors have been identified for the 132kv overhead line and 132kv portion/yard of the shared 33kv/132kv onsite substation and are further discussed below.

14.1.3 Activity/technology alternatives

Activity alternatives refer to the consideration of alternatives requiring a change in the nature of the proposed activity to be undertaken.

No other activity / technology alternatives are being considered. Renewable energy development in South Africa is highly desirable from a social, environmental and development point of view. Based on the terrain, the climatic conditions and current land use being agricultural, it was determined that the proposed site would be best-suited for a substation and powerline associated with WEF, instead of any other type of renewable energy technology. It is generally preferred to install wind energy facilities (WEFs) on elevated ground. There is also not enough rainfall in the area to justify a hydro-electric plant. Therefore, the only feasible technology alternative on this site is WEF with associated infrastructure and as such this is the only technology alternative being considered.

One (1) type of activity is therefore considered (namely 132kV overhead power line and on-site switching substation and/or combined collector substation) in order to feed the electricity / energy generated from a renewable source of energy, wind energy (namely the Patatskloof WEF – separate application), into the national electricity grid.

14.1.4 Design or Layout alternatives

Layout alternatives have been considered and assessed as part of the BA process. The alternatives which have been considered and assessed as part of the grid connection infrastructure application include two (2) substation site alternatives and six (6) power line corridor route alignment alternatives (**Figure 25**). All alternatives have been comparatively assessed by the respective specialists and assessed against the 'no-go' alternative (i.e. status quo). The various alternatives are described below:

Power Line Corridor

Six (6) power line corridor route alignments are being considered and have been comparatively assessed by the EAP and specialists within a 150m wide assessment corridor (75m on either side of power line) as follows:

1. **Power Line Corridor Option 1** is approximately 16km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
2. **Power Line Corridor Option 2** is approximately 24km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
3. **Power Line Corridor Option 3** is approximately 8km in length, linking either Substation Option 1 or Substation Option 2 to Adamskraal Substation.
4. **Power Line Corridor Option 4** is approximately 25km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation.
5. **Power Line Corridor Option 5** is approximately 24km in length, linking either Substation Option 1 or Substation Option 2 to Kappa Substation. It should be noted that the assessment corridor applied to a short section of this route alignment serving Substation Option 2 has been widened to 300m.
6. **Power Line Corridor Option 6** is approximately 8km in length, linking either Substation Option 1 or Substation Option 2 to Adamskraal Substation.

Power line corridors are being assessed to allow flexibility when determining the final route alignment. Based on the specialist assessments, a few potentially sensitive and/or 'no-go' areas have been identified within the application site. These areas were used to inform the development area for the substation within the application site as well as the routing of the power line corridors. The identified sensitive / 'no-go' areas were also used to perform a comparison of substation site alternatives and the route alternatives. The substation site alternatives and power line route alternatives and results of the comparative assessment of alternatives have been discussed in more detail below.

14.1.5 No – go option

The 'no-go' alternative is the option of not undertaking the proposed grid connection infrastructure project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts from the proposed project on the site or surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the BA process. The entire study area is largely in a natural state, but used for animal production. The vegetation in the study area is used primarily for livestock grazing and is affected to some degree by this usage, but not to the extent that any severe degradation was noted on site. The 'no-go' would therefore imply that the land would remain as per the *status quo*, undeveloped.

On a regional scale, the '*No-go*' alternative is not preferred. The proposed substation and power line development (part of this application) will serve the Patatskloof WEF Project. Once fully developed, the intention is to feed the electricity generated by the above-mentioned project into the national grid.

The ‘no-go’ option is a feasible option, however, this would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

Renewable energy facilities are key to the success of South Africa’s plan to build resilience against climate change. South Africa currently relies almost completely on fossil fuels as a primary energy source (approximately 72%). Coal combustion in South Africa is the main contributor to carbon dioxide emissions, which is one (1) of the main greenhouse gasses that has been linked to climate change. With the global focus on climate change, the government is under pressure to explore alternative energy sources in addition to coal-fired power stations.

An emphasis has therefore been placed on securing South Africa's future power supply through the diversification of power generation sources. Furthermore, South Africa is required to invest in a power generation mix, and not solely rely on coal-fired power generation, to honour its commitments made under the Copenhagen Accord and subsequent Paris Agreement (ratified during November 2016) to mitigate climate change challenges. This proposed development can commit to feeding electricity generated from clean, green energy (namely wind) into the national grid. This allows the development to conform with the move towards a greener and cleaner energy generation mix in South Africa.

The above-mentioned alternatives (including ‘no-go’ alternative) were all assessed by the appointed specialists as part of the BA process (this application). All the above-mentioned substation site and power line corridor route alternatives were informed by the identified environmental sensitive and/or ‘no-go’ areas (i.e. status quo). The respective alternatives which were considered as part of the BA process for the proposed development were also comparatively assessed.

14.1.6 Comparative Assessment of Alternatives

The proposed substation site alternatives and power line route alternatives which were investigated and comparatively assessed as part of the BA process, in relation to the identified environmental sensitive and/or 'no-go' areas, are shown in **Figure 25** below.

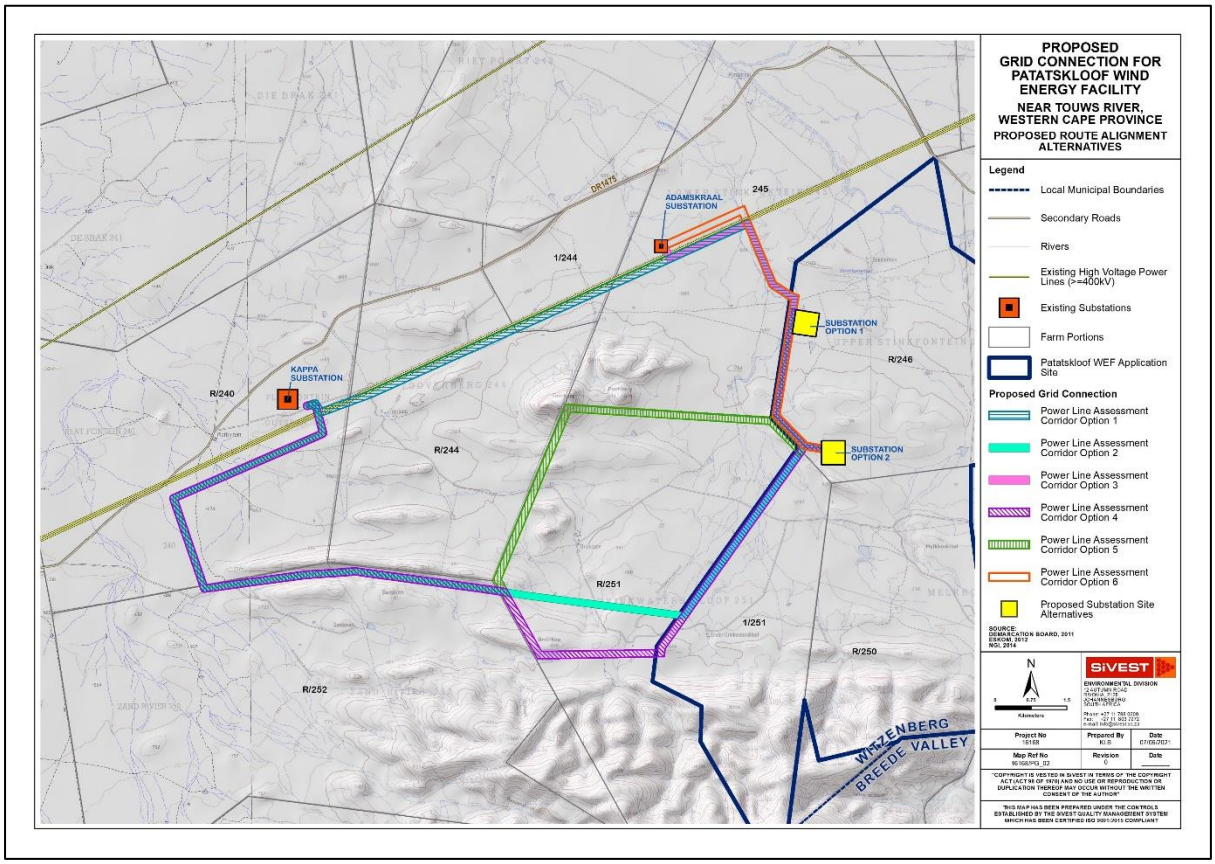


Figure 25: Preliminary Layout

Each of the alternatives have been comparatively assessed in terms of the findings from the specialist assessments conducted as part of the BA process and is summarised in the table below.

Key

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
NOT PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 15: Summary of comparative assessment of substation site alternatives for 132/11kV Substation

ALTERNATIVE	ENVIRONMENTAL ASPECT													FATAL FLAW (YES / NO)	APPLICANTS PREFERENCE
	Agric. and Soils	Avifauna	Bat	Terrestrial Ecology	Geotech	Archaeo	Palaeo	Cultural	Noise	Social	Surface Water	Transportation	Visual		
SUBSTATION SITE ALTERNATIVES															
Option 1	Not assessed	No preference	Least preferred	Least preferred	No Preference	No Preference	No preference	Favourable	No preference	No preference	Least preferred	No preference	Favourable	NO	No preference
Option 2	Not assessed	No preference	Favourable	Least preferred	No Preference	No Preference	No preference	Least preferred	No preference	No preference	Least preferred	No preference	Favourable	NO	No preference

Table 16: Summary of comparative assessment of power line corridors

ALTERNATIVE	ENVIRONMENTAL ASPECT													FATAL FLAW (YES / NO)	APPLICANTS PREFERENCE
	Agric. and Soils	Avifauna	Bat	Terrestrial Ecology	Geotech	Archaeo	Palaeo	Cultural	Noise	Social	Surface Water	Transportation	Visual		
POWER LINE CORRIDOR ROUTE ALTERNATIVES															
Option 1	Not assessed	Least preferred	Not assessed	Favourable	No Preference	No Preference	Least Preferred	Favourable	Not assessed	No preference	Favourable	No preference	Favourable	NO	Preferred
Option 2	Not assessed	Least preferred	Not assessed	Least preferred	No Preference	Least preferred	Least Preferred	Least Preferred	Not assessed	No preference	Least preferred	No preference	Least preferred	NO	
Option 3	Not assessed	Preferred	Not assessed	Least preferred	No Preference	No Preference	Preferred	Preferred	Not assessed	No preference	Least preferred	No preference	Preferred	NO	
Option 4	Not assessed	Least preferred	Not assessed	Least preferred	No Preference	No Preference	Least Preferred	Least preferred	Not assessed	No preference	Least preferred	No preference	Least preferred	NO	
Option 5	Not assessed	Least preferred	Not assessed	Least preferred	No Preference	No Preference	Least Preferred	Least preferred	Not assessed	No preference	Least preferred	No preference	Least preferred	NO	
Option 6	Not assessed	Preferred	Not assessed	Favourable	No Preference	No Preference	Preferred	Favourable	Not assessed	No preference	Favourable	No preference	Preferred	NO	

The results of the comparative assessment for the power line alternatives resulted in power line Option 6 as the most preferred from a specialist point of view. The specialist motivations for their preferences are as follows:

Avifaunal

The avifaunal specialist prefers Option 3 and Option 6 due to the relatively short length of the proposed transmission line and the fact that they would run along existing transmission lines. The remaining options are least preferred, and they will result in more habitat transformation/disturbance and a higher collision risk to birds due to the length of the proposed transmission line.

Terrestrial

The terrestrial specialist has found Option 1 and 6 to be favourable as it can span all sensitive systems. The remaining option are least preferred as these lines follow or cross several very high sensitivity areas.

Aquatic

The aquatic specialist has found Option 1 and 6 to be favourable as it can span all sensitive systems. The remaining option are least preferred as these lines follow or cross several very high sensitivity areas.

Archaeological

The archaeological specialist does not prefer Option 2 as there may be impact on some of the identified heritage resources. The specialist has no preference for the remaining options.

Palaeontological

The palaeontological specialist prefers both Option 3 and 6 as the grid lines are shorter and would have similar impact significance due to similar geological context. The remaining options are least preferred as the grid lines are longer and would have similar impact significance due to similar geological context.

Cultural Landscape

The cultural landscape specialist prefers Option 3 as it is the shortest route along existing grid lines which are adjacent to the existing WEF development. Option 1 and 6 are favourable as they are located along existing gridlines. The remaining options are least preferred due to increased clutter and degradation of rural cultural landscape.

Visual

The visual specialist prefers Option 3 and 6 due to the fact that this route alignment is considerably shorter than the others and affects fewer sensitive and potentially sensitive receptors. Option 1 is favourable as much of this route alignment is directly adjacent to the existing 400kV power lines, thus the visual impacts resulting from the new power line would be reduced by the presence of existing power lines. The remaining options are least preferred due to the length of this route alignment, the extent of untransformed land and the number of receptors affected.

14.1.7 Motivation and concluding statement for the preferred alternative

The applicant has chosen Option 1 as their preferred grid option. The preferred route was chosen due to the existing grid lines which the proposed line will run parallel to. This is also the route which the applicant has entered into servitude option agreements with the landowners for. Furthermore, this route is the most direct and will be the easiest to construct.

Option 1 is least preferred from an Avifaunal and Palaeontological perspective however it is not fatally flawed.

The substation site locations have been based on proximity to the WEF and have been assessed by the specialists in their respective specialist studies The location of the Substations are constrained by a number of sensitivities as well as riverine habitat and the most feasible option has been selected taking all site sensitives into account Based on the results of the comparative assessment of substation site alternatives, Option 2 is the most preferred substation location from a specialist point of view, as identified by the bat and visual specialists. Further, based on the site sensitivity mapping, it is located outside of all no-go areas. The cultural specialist identified Option 1 substation as preferable (but must be located outside of CBA without impacting on a riverine corridor flood line or a slope over 3%.) and Option 2 as least preferred (as it is located on sensitive raised elevation in landscape unit B) with the remaining specialists having no preference on the location of the substation. The developer has not indicated a preference. Both are deemed acceptable for authorisation since none are fatally flawed. It is therefore requested that Substation Option 2 be authorised as part of the proposed development (with micrositing to be undertaken) (should the EA be granted).

14.2 Public Participation Process undertaken

Public participation is the cornerstone of any EIA. The principles of the NEMA as well as the EIA Regulations (as amended 2017) govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth. All documents relating to the PP process have been included in **Appendix 5**.

The aim of the BA Process is to collect the issues, concerns and queries of interested and affected parties (I&APs). The main objective is to:

- Inform the stakeholders about the proposed project and the environmental assessment process to be followed;
- Provide opportunity to all parties to exchange information and express their views and concerns;
- Obtain contributions from stakeholders (including the client, consultants, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented;
- Evaluate the issues raised and identify the significant issues; and
- Provide comment on how these issues are to be assessed as part of the Environmental Assessment Process.

14.2.1 Identification of Key Stakeholder and I&AP's

Liaison with the relevant authorities plays a crucial role in the successful completion of any environmental assessment process. In addition to the competent authority, DFFE, key stakeholders,

the local municipality as well as other potentially affected I&APs, including adjacent property owners and dwellers, are identified.

14.2.2 Responsibilities of interested and affected parties (I&AP's)

Members of the public who want to participate in the assessment process need to register and are referred as I&AP's. Registered I&AP's are entitled to comment, in writing, on all written submissions to the authority and to raise any issues that they believe may be significant, provided that:

- Comments are submitted within the timeframes set by the competent authority or extensions of timeframes agreed to by the applicant, EAP and competent authority.
- A copy of the comments submitted directly to the competent authority is served on the applicant or EAP.
- The I&AP discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

14.2.3 Steps taken to notify key stakeholders and potential I&APs

Notification of BA process to be undertaken as follows:

- Issuing of the notifications and initial landowner consultation (to be circulated to all I&APs in December 2022 respectively as part of the Draft Basic Assessment Report (proof to be included in Final Basic Assessment Report).
- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **02 December 2022** (proof included in the Basic Assessment Report).
- Notification letters to be sent via E-mail or sms (if cell phone number / email is available, it is assuming the I&AP have an email or cell phone).
- Public notification of the BA process was advertised along with the WEF project, in a local newspaper (**namely Die Courier** on **02 December 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof to be included in the Draft Basic Assessment Report.

Availability of report for review:

- Report available on SiVESTs website for download.
- Electronic copies can be made available to parties via a secure digital link that will be emailed upon request for the documentation.
- CDs / Flash drive to be posted, only if requested.
- The Draft Basic Assessment Report will be located and available for review at the following locations:
    - John Steyn Public library, 33 Owen Street (opposite post office and shopping centre), Ceres, Western Cape, South Africa.

14.2.4 Summary of issues raised

To be updated once the Public Comment Period has been completed from **05 December 2022** to **26 January 2023** (excluding the period **15** December 2022 to **5 January** 2023).

14.2.5 Details of notification of landowners

Regulation 39 (1) of the EIA Regulations, 2014 (as amended), states that '*if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land*'.

Regulation 39 (2) of the 2014 NEMA EIA Regulations, 2014 (as amended), further states that '*sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014'*.

The proposed Patatskloof grid development constitutes a linear activity and landowner consent is therefore not required.

In terms of the Chapter 6, Section 39 of the EIA Regulations, 2014 (as amended), notification of directly adjacent landowners and occupiers is required. As a result, the affected and adjacent landowners were notified of the proposed development accordingly. Proof of notification will be included in the FBAR.

15. IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE

The SiVEST Impact Assessment method, dated 28 July 2017 (attached as **Appendix 7**) has been utilised to assess the following potential impacts identified in the assessment phase and is presented in the following sections.

The method used in this impact assessment determines significance (can be both positive and negative) of an impact by multiplying the value of the environmental system or component affected by the magnitude of the impact on that system or component (System or Component Value x Impact Magnitude).

In this method, all significant impacts on the natural or biophysical environment are assessed in terms of the overall impacts on the health of ecosystems, habitats, communities, populations and species. Thus, for example, the impact of an increase in stormwater runoff generated by a development can only be assessed in terms of the impact on the health of the affected environmental systems.

Similarly, all significant impacts on the social and socio-economic environment are assessed in terms of the overall impacts to the quality of life, health and safety of the affected population, communities and/or individuals, with the exception of impacts on resources that are assessed on their own.

The following impacts have been identified for the grids:

15.1 Planning

Table 17: Planning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater- None Identified																				
Agricultural – Compliance Statement																				
Avifaunal- None Identified																				
Bat- None Identified																				
Social																				
Political and social resources	Corruption	4	2	2	3	4	2	30	-	Medium		4	2	2	3	4	2	30	-	Medium
Heritage																				
Stone Age and Rock Art sites	Construction activities close to these resources can damage and cause irreparable damage or destroy the resource. Rock art sites are extremely sensitive to human actions and are easily damaged.	1	2	4	3	4	4	56	-	High	1. An archaeological walk down of the final approved layout will be required before construction commence. 2. Implement a 200-meter buffer around the rock art sites at (PK 29, PK 42 and PK 46) 3. A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. 4. Chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation. 5. Demarcate as no-go areas	1	1	3	3	4	2	24	-	Medium
Chance finds	Destruction or damage to previously unidentified archaeological or historical resources	1	2	4	3	4	4	56	-	High	1. A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	1	1	3	3	4	1	12	-	Low
Heritage: Cultural Landscape																				
Ecological	Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	2	4	3	3	3	4	60	-	High	▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. ▪ No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. ▪ Renosterveld, and in this case, the Matjiesfontein Shale Renosterveld is found in the mid-elevations, and should	2	2	2	1	3	2	20	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											be kept free from development. Renosterveld is classified as a threatened ecosystem, only found within the boundaries of South Africa. Care should be taken that we do not needlessly destroy our rare resources that determine the character of the Karoo landscape, and often on the mid-slopes. ▪ Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources be maintained. ▪ Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.									
Aesthetic	Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	2	4	4	4	3	4	68		Very High	• Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. • Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape. • Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads. • Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, such as Tooverberg, Pramberg and the Pienaarspoort, as these are important place making and orientating elements for experiencing the cultural landscape. • Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. • Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines as far possible. • Due to the scenic and historic significance of the regional road, a buffer of 500m to either side of the district road should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road.	2	3	2	3	3	3	39		Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											• Due to the impact of the noise and shadow flicker of wind turbines on residents, the turbines should be placed at 1km from any occupied homestead. • Alternative Option 3 for the grid corridor is preferred in terms of cultural landscape assessment as it limits the construction to a smaller footprint on the landscape and locates the infrastructure close to existing industrial elements. It should be moved out of the CBA without impacting on a riverine corridor, flood line or a slope over 3%. • Substation option 1 is preferred due to its location close to other industrial elements. It should be moved out of the CBA without impacting on a riverine corridor, flood line or a slope over 3%. • The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.								
Historic	Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	2	4	3	4	4	4	68		Very High	• Due to the scenic and historic significance of the regional road, a buffer of 500m to either side of the district road should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. • The integrity of the historic farmsteads and their associated cultivated areas and relationship to the riverine corridors and other natural elements, such as Tooverberg, should be maintained and protected. Location of proposed turbines should be limited to a 1000m buffer around the farmsteads as far possible to limit impact to the farmsteads. • Any development that impacts the inherent character of the werf component should be discouraged and a development buffer of 50m around the outer boundary of farm werfs and 300m around any graded heritage structure, must be maintained, including the associated cultivated areas, cemeteries and unmarked graves, for all new infrastructure. • The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character should be retained and used as heritage resources related to intangible heritage. Public access to these sites should be encouraged. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must	2	2	2	1	3	2	20		Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											• be assessed and should be discouraged. No development closer than 100m from the boundary of any burial grounds or unmarked graves. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. Unmarked graves in the Stinkfontein site should be protected from development impact. • Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. • Maintain traditional movement patterns across rural landscapes or to places of socio-historical value. (a) Avoid privatization or the creation of barriers to traditional access routes, such as the road through Pienaarspoort. (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails, such as the historic Grand Trunk Road which runs past Stinkfontein. • Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. • Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.									
Socio-economic	Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	2	4	4	3	4	4	68	-	Very High	• The findings of this report must be shared with identified interested and affected parties, <u>including non-landowner residents on the development properties</u>, in the EIA public participation process in order to further ascertain any intangible cultural resources that may exist on the landscape that have not been identified. A specialist qualified in recognising and discussing significance of intangible heritage resources should be present during the public meetings. The findings should inform the recommendations for appropriate mitigation for impacts to the cultural landscape. • The continued use of the landscape for human habitation and cultivation by historic residents of the area should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.	2	2	1	2	4	2	22	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											• The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases.									

15.2 Construction

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
Impact 1: Loss of aquatic species of special concern	The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	1	1	1	1	1	1	5	-	Low	Develop and implement an Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	1	1	1	1	1	5	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Impact 2: Damage or loss of riparian and alluvial systems in the construction phase	Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	2	3	2	2	3	2	24	-	Medium	A pre-construction walkthrough with an aquatic specialists is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies: Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.	1	3	2	1	2	2	18	-	Low
Impact 3: Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system	1	3	2	2	3	3	33	-	Medium	• All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting. • Littering and contamination associated with construction activity must be avoided through effective construction camp management; • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;	1	3	2	1	2	2	18	-	Low
Terrestrial Ecology																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Impact 1: Loss of species of special concern	The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	1	1	1	1	1	1	5	-	Low	Develop and implement an Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	1	1	1	1	1	5	-	Low
Impact 2: Loss of terrestrial habitats – flora and vegetation	The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	2	3	2	2	3	2	24	-	Medium	A pre-construction walkthrough by the ecologist is recommended, who can assist with the development of the Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints. Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	3	2	1	2	2	18	-	Low
Impact 3: Loss of terrestrial species - fauna	Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	2	3	2	2	3	2	24	-	Medium	Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers; Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them; All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr; Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.	1	3	2	1	2	2	18	-	Low
Agricultural – Compliance Statement																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Avifaunal																				
Avifauna	Displacement of priority species due to habitat destruction in the substation footprint	1	1	3	4	3	1	12	_	Low	(1) A site-specific Construction Environmental Management Programme (CEMPr) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction and degradation of habitat. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. (2) The minimum footprint areas for infrastructure should be used. (3) Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks) must be undertaken and to this end a habitat restoration plan is to be developed by a rehabilitation specialist and implemented accordingly.	1	1	3	4	3	1	12	_	Low
Avifauna	Displacement of priority species due to disturbance associated with the construction activities	1	3	2	3	1	3	30	_	Medium	(1) No off-road driving should be allowed. (2) Existing roads should be used as much as possible. (3) Measures to control noise must be implemented according to industry best practice (4) Access to the rest of the property must be restricted.	1	2	2	1	1	2	14	_	Low
Bat																				
Clearing and excavation of natural habitat	The destruction of features that could serve as potential roosts, such as rock formations and the removal of trees on site. The destruction of derelict holes, such as aardvark holes, and any fragmentation of woody habitat which include relative dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in and or the foraging habitat of clutter and clutter-edge species.	1	4	3	3	4	3	42	-	Medium	▪ Apart from access roads, construction activities to be kept out of all no-go and high bat sensitive areas. ▪ Rock formations occurring along the ridge lines should be avoided during construction, as these serve as roosting space for bats. ▪ Destruction of trees should be avoided during construction. ▪ Care should be taken that now roosts occur in the vegetation if any dense bushes are destroyed. ▪ Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats. The Environmental Control Officer (ECO), or a responsible appointed person or site manager, should contact a bat specialist before construction commences so that they know what to look out for during construction.	1	4	2	2	2	2	22	-	Low
Geotechnical																				
Disturbance/ displacement/ removal of soil and Rock	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	2	2	3	1	12	-	Low	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
(Option 1)																				
Soil Erosion (Option 1)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	2	2	2	1	11	-	Low	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	1	1	2	1	7	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 2)	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	3	2	3	1	13	-	Low	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low
Soil Erosion (Option 2)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	3	2	2	1	12	-	Low	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	2	1	2	1	8	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 3)	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	2	2	3	1	12	-	Low	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low
Soil Erosion (Option 3)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	2	2	2	1	11	-	Low	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings	1	2	1	1	2	1	7	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas									
Disturbance/ displacement/ removal of soil and Rock (Option 4)	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	3	2	3	1	13	-	Low	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low
Soil Erosion (Option 4)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	3	2	2	1	12	-	Low	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	2	1	2	1	8	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 5)	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	3	2	3	2	25	-	Medium	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low
Soil Erosion (Option 5)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	3	2	2	2	24	-	Medium	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	2	1	2	1	8	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Disturbance/ displacement/ removal of soil and Rock (Option 6)	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	2	2	3	1	12	-	Low	1) Design access roads and pylon locations to minimise earthworks and levelling based on high resolution ground contour information 2) Correct topsoil and spoil management	1	4	2	1	3	1	11	-	Low
Soil Erosion (Option 6)	Increased erosion due to vegetation clearing, alteration of natural drainage	1	4	2	2	2	1	11	-	Low	1) Avoid development in preferential drainage paths 2) Appropriate engineering design of road drainage and watercourse crossings 3) Temporary berms and drainage channels to divert surface runoff where needed 4) Landscape and rehabilitate disturbed areas timeously (e.g. regressing) 5) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	1	1	2	1	7	-	Low
Transport																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	Medium	• Ensure staff transport is done in the 'off peak' periods and by bus where possible. • Stagger material, component and abnormal loads delivery • Construction of an on-site batching plant and tower construction to reduce trips if possible	2	4	1	2	1	2	20	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Upgrade of existing / new access points • Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences & access cattle grids • Construction of an on-site batching plant and tower construction to reduce trips if possible.	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Upgrade of existing / new access point • Reduction in speed of the vehicles • Construction of gravel roads in terms of TRH20 • Implement a road maintenance program under the auspices of the respective transport department • Possible use of an approved dust suppressant techniques • Construction of an on-site batching plant and	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	1	2	20	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											• Construction of an on-site batching plant and tower construction to reduce trips if possible.									
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	2	16	-	Low	• Enforce a maximum speed limit on the development • Appropriate, timely and high quality maintenance required in terms of TRH20 • Possible use of an approved dust suppressant techniques	1	3	1	1	1	2	14	-	Low
Additional Traffic Generation	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Social																				
Community resources	Availability of community services	2	1	1	2	1	1	7	-	Low		2	1	1	2	1	1	7	-	Low
	Cultural and historic resources	1	3	4	2	4	2	28	-	Medium		1	2	4	2	4	2	26	-	Medium
	Social and community infrastructure	2	2	1	2	3	2	20	-	Low		2	1	1	2	3	2	18	-	Low
Individual and family changes	Annoyance, dust and noise	1	4	1	2	1	2	18	-	Low		1	3	1	2	1	2	16	-	Low
	Crime and security	2	3	2	2	2	2	22	-	Medium		2	2	2	2	1	2	18	-	Low
	Daily living patterns	1	3	1	2	1	2	16	-	Low		1	2	1	2	1	2	14	-	Low
	Employment and business opportunities	2	4	1	2	1	2	20	+	Low		2	4	1	2	1	2	20	+	Low
	Farming operations	1	2	1	2	1	2	14	-	Low		1	2	1	2	1	2	14	-	Low
	Fire hazard	2	2	2	2	1	2	18	-	Low		2	1	2	2	1	2	16	-	Low
	Hazard exposure	2	3	2	2	2	2	22	-	Low		2	2	2	2	2	2	20	-	Low
	STDs, HIV and AIDS	2	3	2	2	4	2	26	-	Medium		2	2	2	2	4	2	24	-	Medium
	Risk to livestock	1	2	1	2	1	2	14	-	Low		1	1	1	2	1	2	12	-	Low
Population characteristics	Temporary influx of construction workers	2	3	1	2	1	2	20	-	Low		2	2	1	2	1	2	18	-	Low
	Informal development and settlements	2	2	1	2	1	2	16	-	Low		2	1	1	2	1	2	16	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Heritage (Cultural Landscapes)																				
Ecological	Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	2	4	3	3	4	3	48	-	High	▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. ▪ No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines ▪ Remaining areas of endemic and endangered natural vegetation should be conserved. ▪ Renosterveld, and in this case, the Matjiesfontein Shale Renosterveld is found in the mid-elevations, and should be kept free from development. Renosterveld is classified as a threatened ecosystem, only found within the boundaries of South Africa. Care should be taken that we do not needlessly destroy our rare resources that determine the character of the Karoo landscape, and often on the mid-slopes. ▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. ▪ Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. ▪ Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. ▪ Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. ▪ Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.	2	2	2	1	4	2	22	+	Low
Aesthetic	WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	2	4	3	3	3	4	60	-	High	• Encourage mitigation measures (for instance use of vegetation) to ‘embed’ or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; • The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building	2	4	2	2	2	2	24	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.								
Historic	Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	2	4	4	3	4	4	68	-	Very High	• Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible. • Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the	2	2	3	2	2	2	22	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patters should be maintained. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not destroyed, as they add to the layering of the area. • Roads running through the area have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Patatskloof should be maintained and integrity as a communal road for farm residents must be retained. • Maintain traditional movement patterns across rural landscapes or to places of socio-historical value. (a) Avoid privatization or the creation of barriers to traditional access routes, such as the road through Pienaarspoort. (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails, such as the historic Grand Trunk Road which runs past Stinkfontein.								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Socio-economic	Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	2	3	4	4	4	4	68	-	Very High	• An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. • The continued use of the landscape for human habitation and cultivation by historic residents of the area should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases. • Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.	1	3	3	1	3	2	22	+	Low
Heritage (Palaeontology)																				
Fossil heritage resources	Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	1	1	4	2	4	1	12	-	Low	Application of Chance Fossil Finds Procedure during construction phase.	1	1	4	2	4	1	12	-	Low
Noise																				
Visual																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
7. Potential alteration of the visual character and sense of place. 8. Potential visual impact on receptors in the study area	9. Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. 10. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. 11. Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. 12. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. 13. Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. 14. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	2	3	1	2	1	2	18	-	Low	15. Carefully plan to minimise the construction period and avoid construction delays. 16. Inform receptors within 500m of the proposed power line servitude of the construction programme and schedules. 17. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 18. Maintain a neat construction site by removing rubble and waste materials regularly. 19. Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. 20. Make use of existing gravel access roads where possible. 21. Limit the number of vehicles and trucks travelling to and from the construction site, where possible. 22. Unless there are water shortages, ensure that dust suppression techniques are implemented: ▪ on all access roads; ▪ in all areas where vegetation clearing has taken place; • on all soil stockpiles.	2	2	1	1	1	2	14	-	Low

15.3 Operational

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
Impact 4 Impact on aquatic systems through the possible increase in surface water runoff on form	Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems,	2	3	2	2	3	3	36	-	Medium	A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be	1	1	1	1	1	1	5	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
and function during the operational phase	which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.										inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks									
Terrestrial Ecology																				
Impact 4: Loss of terrestrial species - fauna	Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	2	3	2	2	3	2	24	-	Medium	Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers; Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them; All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr; Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.	1	3	2	1	2	2	18	-	Low
Avifauna																				
Avifauna	Mortality of priority species due to collisions with the 132kV OHL	1	3	2	4	3	2	26	_	Medium	Bird flight diverters should be installed on the whole line for the full span length according to the applicable Eskom standard at the time.	1	2	2	4	3	2	24	_	Medium
Agricultural – Compliance Statement																				
Geotechnical																				
Soil Erosion (Option 1)	Increased erosion due to alteration of natural drainage	1	2	2	1	2	1	8	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low
Soil Erosion (Option 2)	Increased erosion due to alteration of natural drainage	1	2	2	1	2	1	8	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low
Soil Erosion (Option 3)	Increased erosion due to alteration of natural drainage	1	2	1	1	2	1	7	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low
Soil Erosion (Option 4)	Increased erosion due to alteration of natural drainage	1	2	2	1	2	1	8	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Soil Erosion (Option 5)	Increased erosion due to alteration of natural drainage	1	2	2	1	2	2	16	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low
Soil Erosion (Option 6)	Increased erosion due to alteration of natural drainage	1	2	1	1	2	1	7	-	Low	1) Maintain drainage channels 2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	Low
Social																				
Community resources	Vulnerability of small enterprises	2	2	2	2	2	2	20	-	Low		2	2	2	2	2	2	20	-	Low
	Land use	1	4	1	2	3	2	22	-	Low		1	4	1	2	3	2	22	-	Low
	Livelihoods and ecosystem services	2	2	1	2	3	2	20	-	Low		2	1	1	2	3	2	18	-	Low
Individual and family changes	Employment after construction	2	4	1	2	1	2	20	-	Low		2	3	1	2	1	2	18	-	Low
	Transformation of the sense of place	2	4	4	2	4	2	32	-	Medium		2	4	4	2	4	2	32	-	Medium
Political and social resources	Security of electricity supply	4	4	1	3	3	3	45	+	High										
Heritage (Cultural Landscapes)																				
Ecological	Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	1	4	4	2	3	4	56		High	▪ Areas of endemic and endangered natural vegetation should be conserved. ▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected. ▪ Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. ▪ Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them. ▪ Renosterveld, and in this case, the Matjiesfontein Shale Renosterveld is found in the mid-elevations, and should be kept free from development. Renosterveld is classified as a threatened ecosystem, only found within the boundaries of South Africa. Care should be taken that we do not needlessly destroy our rare resources that determine the character of the Karoo landscape, and often on the mid-slopes.	1	1	4	2	3	2	22		Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aesthetic	Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	2	4	3	3	4	3	48		High	• Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid steep slopes over 10% as well as ridges. • Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within 1000m of the farmsteads and 500m of the district roads. • Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. • Duration and magnitude of operational activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible. • The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.	2	4	3	3	4	2	32		Medium
Historic	Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	2	4	4	4	4	4	72		Very High	• Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No WEF operations traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that	2	2	4	2	4	2	28		Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 100m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not destroyed, as they add to the layering of the area. • Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Patatskloof should be maintained and integrity as a communal road for farm residents must be retained. • Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. • Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Operational traffic must operate at speeds that reduce dust and noise as far possible. Maintain traditional movement patterns across rural landscapes or to places of socio-historical value. (a) Avoid privatization or the creation of barriers to traditional access routes, such as the road through Pienaarspoort. (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails, such as the historic Grand Trunk Road which runs past Stinkfontein								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Socio-economic	Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	2	4	3	4	4	4	68		Very High	• The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases. • Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.	2	3	2	2	3	2	24		Medium
Transport																				
Additional Traffic Generation	Increase in Traffic	2	1	1	2	3	1	9	-	Low	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	Low
	Increase of Incidents with pedestrians and livestock	2	1	1	2	3	1	9	-	Low	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	Low
	Increase in Dust from gravel roads	2	1	1	2	3	1	9	-	Low	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	Low
	Increase in Road Maintenance	2	1	1	2	3	1	9	-	Low	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Abnormal Loads	Additional Abnormal Loads	3	1	1	2	3	1	10	-	Low	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	3	1	1	2	3	1	10	-	Low
Internal Access Roads	New / Larger Access points	1	1	1	2	3	1	8	-	Low	• Adequate road signage according to the SARTSM	1	1	1	2	3	1	8	-	Low
Noise																				
Visual																				
23. Potential alteration of the visual character and sense of place. 24. Potential visual impact on receptors in the study area.	25. The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. 26. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. 27. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. 28. The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	2	4	2	2	3	1	13	-	Low	29. Where possible, limit the number of maintenance vehicles using access roads. 30. Where possible, limit the amount of security and operational lighting present at the on-site substation. 31. Light fittings for security at night should reflect the light toward the ground and prevent light spill. 32. Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. • Non-reflective surfaces should be utilised where possible.	2	4	2	2	3	1	13		Low

15.4 Decommissioning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
Impact 1: Loss of aquatic species of special concern	The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	1	1	1	1	1	1	5	-	Low	Develop and implement an Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	1	1	1	1	1	5	-	Low
Impact 2: Damage or loss of riparian and alluvial systems in the construction phase	Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	2	3	2	2	3	2	24	-	Medium	A pre-construction walkthrough with an aquatic specialists is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and crossings are upgraded, the following applies: Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. River levels, regardless of the current state of the river / water course must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). A detailed monitoring plan must be developed in the pre-construction phase by an aquatic specialist, where any delineated system occurs within 50 m of existing crossings.	1	3	2	1	2	2	18	-	Low
Impact 3: Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the	During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a	1	3	2	2	3	3	33	-	Medium	• All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in	1	3	2	1	2	2	18	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
construction and decommissioning phases	watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system										designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. Note comment regards Camp A that requires micro-siting. • Littering and contamination associated with construction activity must be avoided through effective construction camp management; • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable;									
Terrestrial Ecology																				
Impact 1: Loss of species of special concern	The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed.	1	1	1	1	1	1	5	-	Low	Develop and implement an Rehabilitation and Monitoring plan post Environmental Authorisation. This must be developed following the finalisation of the turbine / road layout and a walk down has been completed. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	1	1	1	1	1	5	-	Low
Impact 2: Loss of terrestrial habitats – flora and vegetation	The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	2	3	2	2	3	2	24	-	Medium	A pre-construction walkthrough by the ecologist is recommended, who can assist with the development of the Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints. Where possible, temporary construction lay-down or assembly areas should be sited on transformed areas; and Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.	1	3	2	1	2	2	18	-	Low
Impact 3: Loss of terrestrial species - fauna	Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	2	3	2	2	3	2	24	-	Medium	Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers;	1	3	2	1	2	2	18	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them; All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr; Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.									
Agricultural – Compliance Statement																				
Avifaunal																				
Avifauna	Displacement due to disturbance associated with the dismantling of the grid connection.	1	4	1	2	1	2	18	-	Low	(1) No off-road driving should be allowed. (2) Existing roads should be used as much as possible. (3) Measures to control noise must be implemented according to industry best practice (4) Access to the rest of the property must be restricted.	1	3	1	2	1	2	16	-	Low
Geotechnical																				
Disturbance/ displacement/ removal of soil and Rock (Option 1)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	2	2	2	1	11	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low
Soil Erosion (Option 1)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	2	2	2	1	9	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	1	1	2	1	6	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 2)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	3	2	2	1	12	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low
Soil Erosion (Option 2)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	3	2	2	1	10	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	2	1	2	1	7	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 3)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	2	2	2	1	11	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Soil Erosion (Option 3)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	2	2	2	1	9	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	1	1	2	1	6	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 4)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	3	2	2	1	12	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low
Soil Erosion (Option 4)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	3	2	2	1	10	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	2	1	2	1	7	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 5)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	3	2	2	1	12	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low
Soil Erosion (Option 5)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	3	2	2	1	10	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	2	1	2	1	7	-	Low
Disturbance/ displacement/ removal of soil and Rock (Option 6)	Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	1	4	2	2	2	1	11	-	Low	1) Restore natural site topography 2) Landscape and rehabilitate disturbed areas timeously (e.g. regrassing)	1	4	2	1	2	1	10	-	Low
Soil Erosion (Option 6)	Increased erosion due to ground disturbance during rehabilitation activities	1	2	2	2	2	1	9	-	Low	1) Temporary berms and drainage channels to divert surface runoff where needed 2) Restore natural site topography 3) Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	1	1	1	2	1	6	-	Low
Heritage (Cultural Landscape)																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Ecological	Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	2	4	3	3	4	3	48	-	High	▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. ▪ No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines ▪ Remaining areas of endemic and endangered natural vegetation should be conserved. ▪ Renosterveld, and in this case, the Matjiesfontein Shale Renosterveld is found in the mid-elevations, and should be kept free from development. Renosterveld is classified as a threatened ecosystem, only found within the boundaries of South Africa. Care should be taken that we do not needlessly destroy our rare resources that determine the character of the Karoo landscape, and often on the mid-slopes. ▪ Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. ▪ Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. ▪ Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. ▪ Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. ▪ Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.	2	2	2	1	4	2	22	-	Low
Aesthetic	Grid infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	2	4	3	3	3	4	60	-	High	• Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; • The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or	2	4	2	2	2	2	24	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape. • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.								
Historic	Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	2	4	4	3	4	4	68	-	Very High	• Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to the outer boundaries of a farm werf, or 200m from graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible. • Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A	2	2	3	2	2	2	22	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											buffer of 50m around such planting patters should be maintained. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not destroyed, as they add to the layering of the area. • Roads running through the area have historic stone way markers. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Patatskloof should be maintained and integrity as a communal road for farm residents must be retained. • Maintain traditional movement patterns across rural landscapes or to places of socio-historical value. (a) Avoid privatization or the creation of barriers to traditional access routes, such as the road through Pienaarspoort. (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails, such as the historic Grand Trunk Road which runs past Stinkfontein.								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Socio-economic	Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	2	3	4	4	4	4	68	-	Very High	• An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. • The continued use of the landscape for human habitation and cultivation by historic residents of the area should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship. • The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases. • Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.	1	3	3	1	3	2	22	-	Low
Transport																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	Medium	• Ensure staff transport is done in the 'off peak' periods and by bus. • Stagger material, component and abnormal loads delivery	2	4	1	2	1	2	20	-	Low
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences & access cattle grids	2	3	2	4	1	1	12	-	Low
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	• Reduction in speed of the vehicles • Appropriate, timely and high quality maintenance required in terms of TRH20 • Possible use of an approved dust suppressant techniques	2	3	2	2	1	2	20	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											• Implement a road maintenance program under the auspices of the respective transport department.									
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department.	2	3	2	2	1	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery. • Adequate enforcement of the law	3	2	1	2	1	1	9	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	1	8	-	Low	• Enforce a maximum speed limit on the development • Appropriate, timely and high quality maintenance required in terms of TRH20 • Possible use of an approved dust suppressant techniques	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Noise																				
Visual																				
33. Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; 34. Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and	36. Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. 37. Decommissioning activities may be perceived as an unwelcome visual intrusion. 38. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. 39. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.	2	3	1	2	1	2	18	-	Low	41. All infrastructure that is not required for post-decommissioning use should be removed. 42. Carefully plan to minimize the decommissioning period and avoid delays. 43. Maintain a neat decommissioning site by removing rubble and waste materials regularly. 44. Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. 45. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. 46. All cleared areas should be rehabilitated as soon as possible.	2	2	1	2	1	2	16	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
35. Potential visual intrusion of any remaining infrastructure on the site.	40. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.										• Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.									

Cumulative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Aquatic / Freshwater																				
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	1	1	1	1	1	1	5	-	Low	The premise of all the reviewed or assessed projects has been the avoidance of impacts on the Very High Sensitivity environments, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines or areas rated as LOW sensitivity.	1	3	2	1	2	2	18	-	Low
Terrestrial Ecology																				
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	1	1	1	1	1	1	5	-	Low	The premise of all the reviewed or assessed projects has been the avoidance of impacts on the Very High Sensitivity environments, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads over minor watercourse / drainage lines or areas rated as LOW sensitivity.	1	3	2	1	2	2	18	-	Low
Agricultural – Compliance Statement																				
Avifaunal																				
Avifauna	(1) Displacement of priority species due to habitat destruction in the substation footprint	2	4	3	3	3	3	45	_	Medium	All the mitigation measures proposed by the avifaunal specialists for the grid connections of the proposed renewable energy facilities should be implemented.	2	3	3	3	3	2	28	_	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	(2) Displacement of priority species due to disturbance associated with the construction activities. (3) Mortality of priority species due to collisions with the 132kV OHL. (4) Displacement of priority species due to disturbance associated with the decommissioning activities.																			
Geotechnical																				
Disturbance/ displacement/ removal of soil and Rock Soil Erosion	No cumulative effect							0										0		
Social																				
Community resources	Vulnerability of small enterprises	2	3	2	3	3	3	39	-	Medium	Regarding the cumulative impacts, mitigation can only be considered and implemented through a readiness action plan at a regional level and will need to be driven on a provincial and municipal basis; underpinned by national government, private sector and public support. In this regard, the Draft Consolidated Intergovernmental Readiness Report for large development scenarios in the Central Karoo **Invalid source specified.** acknowledges the need to prepare for large-scale, or regional, development proposals and to enlist national government, private sector and public participation. It may be pertinent to consider a similar initiative in the Witzenberg Region.								
	Availability of community services	2	3	2	3	3	3	39	-	Medium										
	Cultural and historic resources	2	4	4	3	4	3	51	-	Medium										
	Land use	2	4	2	3	3	3	42	-	Medium										
	Livelihoods and ecosystem services	2	2	2	2	3	2	22	-	Low										
	Social and community infrastructure	2	3	1	2	3	2	22	-	Low										
Individual and family changes	Annoyance, dust and noise	2	4	1	2	3	2	24	-	Medium										
	Blade glint	2	4	1	2	3	2	24	-	Medium										
	Crime and security	2	3	2	3	3	2	26	-	Medium										
	Daily living patterns	2	3	1	2	3	2	22	-	Low										
	Electromagnetic field (EMFs)	2	3	1	2	3	2	22	-	Low										
	Employment after construction	3	4	1	3	3	3	42	-	Medium										
	Employment and business opportunities	3	4	1	3	3	3	42	+	Medium										
	Farming operations	2	4	1	3	3	3	39	-	Medium										

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	Fire hazard	2	3	2	3	3	3	39	-	Medium										
	Hazard exposure	2	3	2	3	3	3	39	-	Medium										
	Shadow flicker	2	4	1	2	3	2	24	-	Medium										
	STDs, HIV and AIDS	3	3	2	3	4	3	45	-	High										
	Risk to livestock	2	4	2	3	3	3	42	-	Medium										
	Transformation of the sense of place	2	4	4	3	4	3	51	-	Medium										
Political and social resources	Corruption	4	3	3	3	4	3	51	-	Medium										
	Security of electricity supply	4	4	3	4	3	3	54	+	High										
Population characteristics	Temporary influx of construction workers	2	4	1	3	3	3	39	-	Medium										
	Informal development and settlements	2	4	1	3	3	3	39	-	Medium										
Heritage																				
Tangible Heritage Resources	The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	4	2	4	4	4	2	36	-	Medium	It can clearly be noted that the area in general is abundant with Stone Age and historical remains. However, until a regional detailed study is commissioned by HWC or SAHRA. No further mitigations measures can be proposed other than those already recommended for the site-specific mitigation of sites in this report.	4	1	4	4	4	1	17	-	Low
Fossil heritage resources	Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	1	1	4	2	4	1	12	-	Low	Application of Chance Fossil Finds Procedure during construction phase	1	1	4	2	4	1	12	-	Low
Ecological	Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	3	4	4	3	4	4	72	-	Very high	Please refer to Appendix 6 for mitigation recommendations for specifically cumulative impacts.	3	2	4	2	3	2	28	-	Medium
Aesthetic	Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	3	4	3	3	3	4	64	-	Very high	NOTE: If the recommendations in this CLA are applied to the majority of the surrounding RE developments, impacts can be reduced to ratings given in this table. With no specialist CLA reports	3	4	2	2	3	2	28	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Historic	Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	3	4	4	4	4	4	76	-	Very high	done on the surrounding applications, cumulative impact on the cultural landscape of the region has not been considered and cannot be included in this rating.	3	2	3	2	3	2	26	-	Medium
Socio-economic	Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	3	4	3	4	4	4	72	-	Very high		3	3	1	1	4	2	24	+	Medium
Heritage (Palaeontology)																				
Fossil heritage resources	Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	3	2	4	2	4	1	15	-	Low	Application of Chance Fossil Finds Procedure during construction phase.	3	2	4	2	4	1	15	-	Low
Heritage (Cultural Landscapes)																				
Ecological	Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	3	4	4	3	4	4	72	-	Very High	Fixed datum or dataset: The region has never been covered by a heritage resources study that can account for all heritage resources. Further to this none of the heritage studies conducted can with certainty state that all heritage resources within the study area have been identified and evaluated. Defined thresholds: The value judgment on the significance of a heritage site will vary from individual to individual and between interest groups. Thus implicating that heritage resources' significance can and does change over time. And so will the tipping threshold for impacts on a certain type of heritage resource; Threshold crossing: In the absence of a comprehensive dataset or heritage inventory of the entire region we will never be able to quantify or set a threshold to determine at what stage the impact from developments on heritage resources has reached or is reaching the danger level or excludes the new development on this basis. NOTE: If the recommendations in this CLA are applied to the majority of the surrounding RE developments, impacts can be reduced to ratings given in this table. With no specialist CLA reports done on the surrounding applications, cumulative impact on the cultural landscape of the region has not been considered and cannot be included in this rating.	3	2	4	2	3	2	28	-	Medium
Aesthetic	Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	3	4	3	3	3	4	64	-	Very High		3	4	2	2	3	2	28	-	Medium
Historic	Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	3	4	4	4	4	4	76	-	Very High		3	2	3	2	3	2	26	-	Medium
Socio-economic	Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	3	4	3	4	4	4	72	-	Very High		3	3	1	1	4	2	24	-	Medium
Noise																				

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Transport																				
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	4	40	-	Medium	• Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area	2	4	1	2	1	3	30	-	Medium
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	3	39	-	Medium	• Reduction in speed of vehicles • Adequate enforcement of the law • Implementation of pedestrian safety initiatives • Regular maintenance of farm fences, access cattle grids • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area	2	3	2	4	1	2	24	-	Medium
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	Medium	• Reduction in speed of the vehicles • Construction of gravel roads in terms of TRH20 • Implement a road maintenance program under the auspices of the respective transport department. • Possible use of an approved dust suppressant techniques • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area	2	3	2	2	1	2	20	-	Low
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	• Implement a road maintenance program under the auspices of the respective transport department. • Construction of an on-site batching plant and tower construction to reduce trips. • Coordination between all developers in the area	2	3	2	2	2	2	22	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	36	-	Medium	• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods. • Adequate enforcement of the law • Coordination between all developers in the area	3	2	1	2	1	2	18	-	Low
Internal Access Roads	Increase in Dust from gravel roads	1	4	1	1	1	3	24	-	Medium	• Enforce a maximum speed limit on the development • Appropriate, timely and high quality maintenance required in terms of TRH20 • Possible use of an approved dust suppressant techniques	1	3	1	1	1	2	14	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	• Adequate road signage according to the SARTSM • Approval from the respective roads department	1	4	1	2	1	1	9	-	Low
Visual																				
47. Potential alteration of the visual character and sense of place in the broader area. 48. Potential visual impact on receptors in the study area. 49. Potential impact on the night time visual environment.	50. Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. 51. Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. 52. Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. 53. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	3	3	2	3	3	2	28	-	Medium	54. Where possible, limit the number of maintenance vehicles using access roads. 55. Non-reflective surfaces should be utilised where possible. 56. Where possible, limit the amount of security and operational lighting present at the on-site substation. • Light fittings for security at night should reflect the light toward the ground and prevent light spill.	3	3	2	2	2	2	24	-	Medium

16. POSITIVE AND NEGATIVE IMPACTS OF THE PATATSKLOOF GRID PROJECT

A summary of the impacts pre-mitigation and post-mitigation are provided below:

Table 18: Summary of impacts pre-mitigation and post-mitigation

Impact	Pre-mitigation	Post-mitigation
PLANNING		
Impacts to Biophysical Systems		
Aquatic / Freshwater – None Identified		
Terrestrial Ecology – None Identified		
Agricultural – Compliance Statement		
Bat – None Identified		
Impacts to Socio-Economic Component		
Social		
Corruption	Medium	Medium
Heritage		
Construction activities close to these resources can damage and cause irreparable damage or destroy the resource. Rock art sites are extremely sensitive to human actions and are easily damaged.	High	Medium
Destruction or damage to previously unidentified archaeological or historical resources	High	Low
Heritage (Cultural Landscape)		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	High	Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Very High	Medium
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Very High	Low
Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	Very High	Low
Noise – None Identified		
Visual – None Identified		
CONSTRUCTION		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	Medium	Low
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system	Medium	Low
Terrestrial Ecology		

Impact	Pre-mitigation	Post-mitigation
The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	Medium	Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural - Compliance Statement		
Avifauna		
Construction: Displacement due to disturbance	Medium	Low
Construction: Displacement due to habitat transformation	Low	Low
Bat		
The destruction of features that could serve as potential roosts, such as rock formations and the removal of trees on site. The destruction of derelict holes, such as aardvark holes, and and fragmentation of woody habitat which include relative dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in and or the foraging habitat of clutter and clutter-edge species.	Medium	Low
Geotechnical		
Ground disturbance during access road construction, foundation earthworks, platform earthworks.	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Medium	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Medium	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Low	Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Low	Low
Impacts to Socio-Economic Component		
Social		
Availability of community services	Low	Low
Cultural and historic resources	Medium	Medium
Social and community infrastructure	Low	Low
Annoyance, dust and noise	Low	Low
Crime and security	Medium	Low
Daily living patterns	Low	Low
Employment and business opportunities	Low	Low
Farming operations	Low	Low
Fire hazard	Low	Low
Hazard exposure	Low	Low
STDs, HIV and AIDS	Low	Low
Risk to livestock	Medium	Medium
Temporary influx of construction workers	Low	Low
Informal development and settlements	Low	Low
Transport		

Impact	Pre-mitigation	Post-mitigation
Increase in Traffic	Medium	Low
Increase of Incidents with pedestrians and livestock	Medium	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low
Heritage (Cultural Landscapes)		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	High	Low
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	High	Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Very High	Low
Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	Very High	Low
Heritage (Palaeontology)		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Low	Low
Visual		
Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from increased traffic on gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. Vegetation clearance required for the construction of the proposed substation is expected to increase dust emissions and alter the natural character of the surrounding area, thus creating a visual impact. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Low	Low
OPERATIONAL		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosions and sedimentation of downstream areas.	Medium	Low
Terrestrial Ecology		
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural – Compliance Statement		
Avifauna		
Mortality of priority species due to collisions with the 132kV OHL	Medium	Low
Geotechnical		
Soil Erosion (Option 1)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 2)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 3)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion (Option 4)- Increased erosion due to alteration of natural drainage	Low	Low
Soil Erosion	Low	Low

Impact	Pre-mitigation	Post-mitigation
(Option 5)- Increased erosion due to alteration of natural drainage		
Soil Erosion (Option 6)- Increased erosion due to alteration of natural drainage	Low	Low
Social		
Vulnerability of small enterprises	Low	Low
Land use	Low	Low
Livelihoods and ecosystem services	Low	Low
Employment after construction	Low	Low
Transformation of the sense of place	Medium	Medium
Security of electricity supply	High	n/a
Heritage (Cultural Landscapes)		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	High	Medium
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	High	Medium
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Transport		
Increase in Traffic	Low	Low
Increase of Incidents with pedestrians and livestock	Low	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
New / Larger Access points	Low	Low
Noise		
Visual		
The proposed power line and substation could alter the visual character of the surrounding area and expose sensitive visual receptor locations to visual impacts. The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment could be altered as a result of operational and security lighting at the proposed substation.	Low	Low
DECOMMISSIONING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		

Impact	Pre-mitigation	Post-mitigation
The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed	Low	Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example	Medium	Low
During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of the 30 000l fuel storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system	Medium	Low
Terrestrial Ecology		
The construction activities will result in the disturbance of both aquatic and terrestrial habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the tower positions proposed.	Low	Low
The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	Medium	Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Medium	Low
Agricultural - Compliance Statement		
Avifauna		
Displacement due to disturbance associated with the dismantling of the grid connection.	Low	Low
Geotech		
Disturbance/ displacement/ removal of soil and Rock (Option 1)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 1)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 2)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 2)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 3)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 3)- increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 4)- Ground disturbance during platform earthworks,road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 4)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 5)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low
Soil Erosion (Option 5)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Disturbance/ displacement/ removal of soil and Rock (Option 6)- Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Low	Low

Impact	Pre-mitigation	Post-mitigation
Soil Erosion (Option 6)- Increased erosion due to ground disturbance during rehabilitation activities	Low	Low
Impacts to Socio-Economic Component		
Social – None Identified		
Heritage (Cultural Landscape)		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	High	Low
Grid infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	High	Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Very High	Low
Integrity of local residents to continue their patterns of land use is degarded by the construction and decommissioning activities.	Very High	Low
Transport		
Increase in Traffic	Medium	Low
Increase of Incidents with pedestrians and livestock	Medium	Low
Increase in Dust from gravel roads	Low	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Low	Low
Increase in Dust from gravel roads	Low	Low
New / Larger Access points	Low	Low
Noise		
Visual		
Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. Decommissioning activities may be perceived as an unwelcome visual intrusion. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	Low	Low
CUMULATIVE		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	Low	Low
Terrestrial Ecology		
The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and or review of the past assessments as part of any required Water Use Licenses	Low	Low
Agricultural - Compliance Statement		
Avifauna		

Impact	Pre-mitigation	Post-mitigation
(5) Displacement of priority species due to habitat destruction in the substation footprint (6) Displacement of priority species due to disturbance associated with the construction activities. (7) Mortality of priority species due to collisions with the 132kV OHL. (8) Displacement of priority species due to disturbance associated with the decommissioning activities.	Medium	Medium
Bat – None Identified		
Impacts to Socio-Economic Component		
Social		
Vulnerability of small enterprises	Medium	n/a
Availability of community services	Medium	n/a
Cultural and historic resources	Medium	n/a
Land use	Medium	n/a
Livelihoods and ecosystem services	Low	n/a
Social and community infrastructure	Low	n/a
Annoyance, dust and noise	Medium	n/a
Blade glint	Medium	n/a
Crime and security	Medium	n/a
Daily living patterns	Low	n/a
Electromagnetic field (EMFs)	Low	n/a
Employment after construction	Medium	n/a
Employment and business opportunities	Medium	n/a
Farming operations	Medium	n/a
Fire hazard	Medium	n/a
Hazard exposure	Medium	n/a
Shadow flicker	Medium	n/a
STDs, HIV and AIDS	High	n/a
Risk to livestock	Medium	n/a
Transformation of the sense of place	Medium	n/a
Corruption	Medium	n/a
Security of electricity supply	Medium	n/a
Temporary influx of construction workers	High	n/a
Informal development and settlements	Medium	n/a
	Medium	n/a
Heritage		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Medium	Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Low	Medium
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Very High	Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Heritage (Palaeontology)		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Low	Low
Heritage (Cultural Landscapes)		

Impact	Pre-mitigation	Post-mitigation
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Very High	Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Very High	Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Very High	Medium
Transport		
Increase in Traffic	Medium	Medium
Increase of Incidents with pedestrians and livestock	Medium	Medium
Increase in Dust from gravel roads	Medium	Low
Increase in Road Maintenance	Low	Low
Additional Abnormal Loads	Medium	Low
Increase in Dust from gravel roads	Medium	Low
New / Larger Access points	Low	Low
Visual		
Additional renewable energy and associated infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. Visual intrusion of multiple renewable energy and infrastructure developments may be exacerbated, particularly in more natural undisturbed settings. Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.	Medium	Medium

16.1 Mitigation measures

Refer to section 15 above. The assessment of each issue/impact is included in Section 15 above and mitigation measures are provided for each impact identified.

17. SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS

Table 19: Summary of specialist findings and recommendations

Specialist Study	Findings	Recommendations
Agricultural	The site has very low agricultural potential predominantly because of climate constraints. As a result of the constraints, the site is totally unsuitable for cultivation, and agricultural land use is limited to grazing. The land is predominantly of low agricultural sensitivity, but includes some areas of medium sensitivity. The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of very limited land capability and is not suitable for the production of cultivated crops, the amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol, the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits, and that the proposed development poses a low risk in terms of causing soil degradation.	The recommended mitigation measures are implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.
Avifaunal	It is estimated that a total of 135 bird species could potentially occur in the broader area of the proposed Patatskloof Wind Energy Facility. Of these, 38 are classified as sensitive species for powerlines. The proposed Patatskloof grid connection will have several potential impacts on priority avifauna. These impacts are the following: • Displacement of priority species due to disturbance linked to construction activities in the construction phase.	The proposed Patatskloof WEF grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The mitigation measures in the report must be strictly adhered to.

Specialist Study	Findings	Recommendations
	• Displacement due to habitat transformation in the construction phase. • Collisions with the overhead line in the operational phase. • Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase.	
Biodiversity	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment as indicated in the Screening Tool Results (CBA, ESA & NFEPA). The information collected, was also compared to previous assessments within the region by members of EnviroSci, used in the assessment of the wind farms that have been completed. In summary three key terrestrial habitats were observed and mapped and then rated based on their sensitivity to the proposed development, with a fourth habitat associated more with the aquatic environment. These habitats included: 5. *Ruschia* quartzites (within in study area but no development take place in these areas) *6.* Tanqua karoo - *Pteronia pallens / Zygophyllum shrubland* *7.* Renosterveld & Fynbos *8.* Tanqua Wash Riviere Several High Sensitivity Habitats were thus observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are	The specialist noted that infrastructure would have to cross some sensitive areas in particular access roads, cables and overhead lines. Therefore, any mitigations around route selections mentioned in the report must be considered (e.g., use existing tracks) and must be considered in the walkdown surveys post authorisation.

Specialist Study	Findings	Recommendations
	spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated.	
Aquatic	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment. Three key aquatic habitats were observed and mapped and then rated based on their sensitivity to the proposed development. These habitats included: 4. Alluvial Wash floodplains (two sub types) 5. Watercourses with or without riparian vegetation 6. Minor watercourses Several High Sensitivity Habitats were observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated after and inspection is conducted by the specialist once the localities have been finalised. However, it is recommended that Grid Options 1 and 6, should be considered further to minimize the extent of access needed when compared to the other 4 grid options.	The specialist noted that infrastructure would have to cross some sensitive areas in particular access roads, cables and overhead lines. Therefore, any mitigations around route selections mentioned in the report must be considered (e.g., use existing tracks) and must be considered in the walkdown surveys post authorisation.
Geotechnical	The assessment area is underlain by rock units of Dwyka Group ad Ecca Group of the Karoo Supergroup and locally by faulted rock units of the Cape Supergroup.	Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in the report.

Specialist Study	Findings	Recommendations
	Some geotechnical constraints have been identified, primarily shallow bedrock which may cause excavation difficulties, thick alluvium and steep slopes. These constraints may be mitigated via standard engineering design and construction measures. Spread footings are considered suitable to support the structures on majority of the site.	
Heritage – Archaeological	A total of 47 sites were identified, consisting of twenty-four (24) Historical Structures (kraals, houses, stonewalling and labourer houses), twenty-one (21) archaeological sites, and two (2) burial ground and graves, that may be affected by the proposed project. A background scatter of stone tools (flakes, cores and blades) was observed throughout the project area. As such only sites with a density of 5 or more tools were recorded as sites. Thirteen of the sites were observed to be in proximity of the grid alignment options. The sites are PK 17, 18, 19, 20, 22, 24, 41, 46, 47, 16, 15, 14, 07.	This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources. An assessment of the final footprint of the new Patatskloof grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMPr. The following mitigation measures will be required: • An archaeological walk down of the final approved layout will be required before construction commences; • Implement a 50-meter buffer around all structures with a rating of IIIC and higher. • Implement a 500-meter buffer around the farmstead site at **PK 15**. • Implement a 200-meter buffer around the rock art sites at **PK 46**. • Demarcate the resources rated as IIIB-IIIA no-go areas. • A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. • A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.

Specialist Study	Findings	Recommendations
Heritage – Cultural	The area proposed for development is located within an undulating Ceres Karoo landscape within which the predominant land use is game grazing. It is a semi-arid region and the vegetation is characteristic of the Succulent Karoo Biome. The area is covered in varying densities of knee high scrub, with tombstone weathered rock outcrops on the elevated areas of the site. Evidence of historic stock management is evident in the various stone kraals located on the site, often on the slopes of the small koppies. An absence of tall trees is noteworthy, with such landscape elements usually associated to cultural activity. The low vegetation accentuates the topography of the landscape, especially areas of elevation such as the Toverberg and Pramberg, which have been used as orientating elements for game and travellers over the landscape through time. There is a farmhouse with some historic elements, as well as a few other historic and modern structures at various stages of use, and numerous farm tracks intersecting the large farm property but the site remains predominantly natural and very isolated. Natural ephemeral streams (currently dry) have cut through the landscape in shallow ravines, with some areas of shallow drainage having allowed for crop cultivation in the past. Various examples of water management through damming and wind pumps are evident on the landscape. Vehicles can be seen traversing the landscape from a distance due to the flat topography and the moving dust columns they create. More recent introductions of the Perdekraal WEFs, the Kappa Substation and other associated electrical grid infrastructure can be found in the general region and directly to the north of the Patatskraal site, which detract from the historic and natural wilderness character of the general region. The Ceres Karoo region is a significant cultural landscape that reflects the	The following heritage indicators and development buffers apply to the grid connection: • Landscape units D and E are suitable for sensitive WEF infrastructure development; • A 500m buffer to either side of the district road for turbine and infrastructure placement (Patatskloof WEF does not propose turbines or infrastructure within this buffer); • 300m buffer to either side of identified significant historic farm roads (pink) for turbine placement, substation and laydown areas; • The historic route (yellow) that passes through Stinkfontein site is no longer in use as such, but should be reinstated as a walking trail and open to public access. • 50m outer boundary buffer for roads and infrastructure around farmsteads including cultivated areas and graves – integrity of farmstead complex as a whole should be retained; • 200m freestanding graded heritage structure buffer for new roads and infrastructure; • 100m buffer from cemetery or unmarked burial for all development; • 400m buffer around water management bio-cultural landscape elements (blue circles); • 600m buffer around significant Stinkfontein site (orange circle); • existing roads to be used with minimal upgrade as far as possible; • riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archeological) whichever is further (buffers not indicated). • CBA and ESA no-go areas for all development, unless otherwise recommended by the biodiversity and environmental specialist studies for this site;

Specialist Study	Findings	Recommendations
	relationship between man and nature over a period of time. This relationship has generally been sustainable, where biodiversity and ecological systems have been maintained in the utilisation of the landscape expressed in specific land use patterns. The surrounding land use indicates a social appreciation of the natural environment with low impact stock and game farming with limited farmstead crop cultivation. The vastness and relative homogenous nature of the cultural landscape is, however, often undervalued. If careful contextual planning is not followed, it will rapidly result in a cluttered wasteland. This does not mean that development is discouraged, but rather that the implementation of wind and solar energy farms should be planned holistically.	• Pienaarspoort gateway buffer included in the 300m farm road buffer and unit A. Further, the following change to the current proposed layout is recommended by the specialist: • The substation option 1 and Gridline alternative 3 should be located out of the CBA, without impacting on the riverine corridor flood line and slopes over 3%.
Heritage – Paleontological	The Patatskloof WEF, BESS and grid connection project areas are underlain by several basinal to shallow marine sedimentary formations of the Witteberg Group (Cape Supergroup), Dwyka Group and Ecca Group (Karoo Supergroup) of Palaeozoic age. All these units are potentially fossiliferous but only two – the Early Carboniferous Waaipoort Formation and the Early Permian Whitehill Formation – are generally regarded as of high palaeosensitivty due to their record of well-preserved fish, mesosaurid reptiles, crustaceans and plant fossils in the Tanqua - Ceres Karoo region and elsewhere. The overall impact significance of the construction phase of the proposed Patatskloof WEF and grid connection regarding legally-protected palaeontological heritage resources is assessed as LOW (negative status), with and without mitigation. This assessment applies equally to all layout alternatives and grid connection options under	No palaeontological High Sensitivity or No-Go areas have been identified within the grid connection project areas. None of the recorded fossil sites lies within the development footprint as currently defined. Pending the potential discovery of significant new fossil material here during the construction phase, no specialist palaeontological monitoring or mitigation is recommended for these developments. Recommended mitigation comprises: (5) The Environmental Site Officer (ESO) should be made aware of the possibility of important fossil remains (bones, teeth, fish, petrified wood, plant-rich horizons *etc*) being found or unearthed during the construction phase of the development. (6) Monitoring for fossil material of all major surface clearance and deeper (> 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended.

Specialist Study	Findings	Recommendations
	consideration. There is therefore no preference on palaeontological heritage grounds for any specific layout (e.g. location of on-site substation, construction laydown area, grid connection corridor) among those under consideration. No significant further impacts on fossil heritage are anticipated during the operational and decommissioning phases of the renewable energy developments. The No-Go alternative (i.e. no WEF / grid development) would probably have a neutral impact on palaeontological heritage. No palaeontological High Sensitivity or No-Go areas have been identified within the WEF and grid connection project areas. None of the recorded fossil sites lies within the development footprint as currently defined. Pending the potential discovery of significant new fossil material here during the construction phase, no specialist palaeontological monitoring or mitigation is recommended for these developments. The Environmental Site Officer (ESO) should be made aware of the possibility of important fossil remains (bones, teeth, fish, petrified wood, plant-rich horizons etc) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (> 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended. Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional palaeontologist. Provided that these monitoring and mitigation measures are followed through, residual impacts for the Patatskloof WEF and grid projects are rated as LOW. Inevitable loss of some fossil heritage during the construction phase may be - at	(7) Significant fossil finds should be safeguarded and reported at the earliest opportunity to Heritage Western Cape for recording and sampling by a professional palaeontologist. (8) A protocol for Chance Fossil Finds is appended to this report (Appendix 2). These recommendations must be included within the Environmental Management Programmes (EMPrs) for the Patatskloof WEF, BESS and grid connection developments.

Specialist Study	Findings	Recommendations
	least partially - offset by an improved understanding of local palaeontological heritage through professional recording and mitigation of any significant new fossil finds (This may be considered as a positive impact). Due to the generally low palaeosensitivity of the Ceres Karoo as a whole, anticipated cumulative impacts of the known renewable energy projects proposed or authorised in the region are assessed as LOW (negative) with and without mitigation. It is concluded that, as far as fossil heritage resources are concerned, the proposed Patatskloof WEF and grid connection projects, whether considered individually or together, will not result in any unacceptable loss or impact considering all the renewable energy projects proposed in the area. This analysis only applies provided that all the proposed monitoring and mitigation recommendations made for the other renewable energy projects proposed or authorised in the Ceres Karoo are fully and consistently implemented.	
Social	While the project will create employment for local communities during the construction and operational phases, the more significant positive impact of the project will be the contribution it will make towards renewable energy infrastructure. Research recently published by Meridian Economics, in collaboration with the CSIR, indicates that "[in all realistic mitigation scenarios, the majority of new build capacity is wind and solar PV" **Invalid source specified.**, and highlights an urgent need for the country to accelerate the RE build pathway. In addition, the South African Climate Change Coordinating Commission, is considering a more ambitious emissions target and is suggesting changes to the country's energy plan **Invalid source specified.**.	Considering all social impacts associated with the project, it is evident that, at the social level, the positive elements outweigh the negative and that the project carries with it a significant social benefit at a national level and is therefore supported. In addition, no compelling preference emerges in respect of the alternatives and it would be socially acceptable for the authorisation of either power line alternative.

Specialist Study	Findings	Recommendations
	Considering the impacts discussed above, it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to any one project. The initiative to address these cumulative impacts lies at a far higher level than at an individual project level. In this regard, the Western Cape Government has undertaken an exercise to address intergovernmental readiness for the large development scenarios in the Central Karoo; which is a positive step towards addressing the cumulative impact of these developments **Invalid source specified.**.	
Aquatic	The study area had received some much-needed winter rainfall, which aided in critically assessing the ecological character of the site, with particular reference to any linkages between the aquatic and terrestrial environment as indicated in the Screening Tool Results (CBA, ESA & NFEPA). The information collected, was also compared to previous assessments within the region by members of EnviroSci, used in the assessment of the wind farms that have been completed. In summary three key aquatic habitats were observed and mapped and then rated based on their sensitivity to the proposed development. These habitats included: 4. Alluvial Wash floodplains (two sub types) 5. Watercourses with or without riparian vegetation 6. Minor watercourses Several High Sensitivity Habitats were observed and mapped, and these were then considered No-Go for any new infrastructure, while Moderate and Low sensitivity areas could be considered for	It is recommended that Grid Options 1 and 6, should be considered further to minimize the extent of access needed when compared to the other 4 grid options. The project must still be assessed once the roads layout has been provided, coupled to a micrositing walkdown once all information is available. Noteworthy areas, that should be avoided, include the Very High Sensitivity areas as shown in this report. Existing crossings may be used and/or upgraded that intersect these systems however, but these crossings, detailed monitoring plan must be developed in the pre-construction phase.

Specialist Study	Findings	Recommendations
	development. The only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas, if these areas are spanned and/ or located within existing disturbance footprints (e.g. roads within existing farm tracks) and/or suitably mitigated after and inspection is conducted by the specialist once the localities have been finalised.	

Transportation	The development, is located in a rural part of the Western Cape Province, with the existing road network able to provide access to the development. A number of other renewable energy developments have already been completed or are in the process of being completed in the immediate area.
	
	The construction phase or Balance of Plant phase of this development will typically generate the highest number of additional vehicles. Of these additional vehicles, ±57 trips / hour will occur in the morning and afternoon outside of the peak period, while ±4 trips / hour will occur during the midday peak for construction material and abnormal loads. The impact will however be temporary and are considered to be nominal if adequately mitigated.
	
	During the operation phase, it is expected that the facility will accommodate ±30 employees and generate an additional ±10 trips / day in the morning and afternoon peak period. This impact is considered to be nominal.
		• The existing access points from Road OP06121 does not have sufficient sight distance or is located in a drainage line and hence will require relocation to a new access position @ Km 13.44.
		• External road upgrades required on Road DR01475 between Km 50.73 – Km 46.60
		• External road upgrades required on Road OP06121 between Km 13.44 – Km 16.70
		• Intersection upgrade to Road DR01475 and Road OP06121 junction
		• All external road upgrades require approval and a wayleave application from the Western Cape Department of Transport & Public Works prior to work commencing.
		• Mitigation measures to be included in the construction / Balance of Plant phase:
		  ○ Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods.
		  ○ Stagger material, component and abnormal loads deliveries
		  ○ Adequate road signage on all external roads carrying development traffic according to the SARTSM
		  ○ Reduction in speed of vehicles
		  ○ Adequate enforcement of the law
		  ○ Implementation of pedestrian safety initiatives
		  ○ Regular maintenance of farm fences & access cattle grids

Specialist Study	Findings	Recommendations
		○ Construction of gravel roads in terms of TRH20 ○ Implement a road maintenance program under the auspices of the respective transport department. ○ Possible use of an approved dust suppressant techniques
Visual	Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development with associated grid connection infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be significantly reduced by the presence of the Kappa Substation, high voltage power lines and Perdekraal East WEF within the study area. A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **moderate** visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. The study area is not typically known for its tourism significance and there is however limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of twenty-one (21) potentially sensitive receptors were identified within the combined study area, although only eleven (11) of these were found to be within the	The proposed new power line route alignment is expected to be highly incongruous as much of the route is close to existing 400kV power lines. In addition, the grid connection infrastructure is intended to serve the proposed WEF and as such, will only be built if this project is developed. The power lines and substations are therefore likely to be perceived as part of the greater WEF development and the visual impact will be relatively minor when compared to the visual impact associated with the development as a whole. The impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

Specialist Study	Findings	Recommendations
	viewshed for the proposed WEF. Two (2) of these receptors are considered to be sensitive receptors as they are linked to leisure/nature-based tourism activities in the area. One of the sensitive receptors is expected to experience high levels of visual impact from the WEF facility, namely Ibhadi Game Lodge. It should be noted that this rating is largely due to the location of the main residence / accommodation complex inside the Patatskloof WEF development area. It is therefore assumed that the property owners have a vested interest in the proposed development and would not perceive the WEF in a negative light. Accordingly, visual impacts would be significantly reduced. The remaining sensitive receptor would experience only moderate levels of impact. Nine (9) of the receptors identified are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Only two (2) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. Neither of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Five (5) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Patatskloof WEF development while the remaining two (2) receptors would only experience low levels of visual impact. Both sensitive receptors (SR1 and SR2) identified within 5km of the power line assessment corridors would experience only moderate levels of visual impact as a result of the proposed 132kV power line associated with the Patatskloof WEF	

Specialist Study	Findings	Recommendations
	development. Impacts affecting SR2 are however expected to be reduced in light of the fact that this receptor is located in the Patatskloof WEF development area. Three (3) of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed power line. The high sensitivity rating relates largely to the fact that these receptors are located in areas of high visual contrast that are also relatively close to the proposed power line route alignments. One of these receptors, namely VR3 is in fact located within the assessment corridors for power line Options 2, 3, 4 and 5. Impacts affecting these receptors are however expected to be reduced by the presence of existing high voltage power lines already visible to these receptors. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. The remaining two (2) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line. Although the N1 receptor road traverses the study area, wind turbines and power line infrastructure will not be visible from this section of the road.	

18. ENVIRONMENTAL IMPACT STATEMENT

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted and that the layout being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

A layout of the development and the environmental sensitivities is included below:

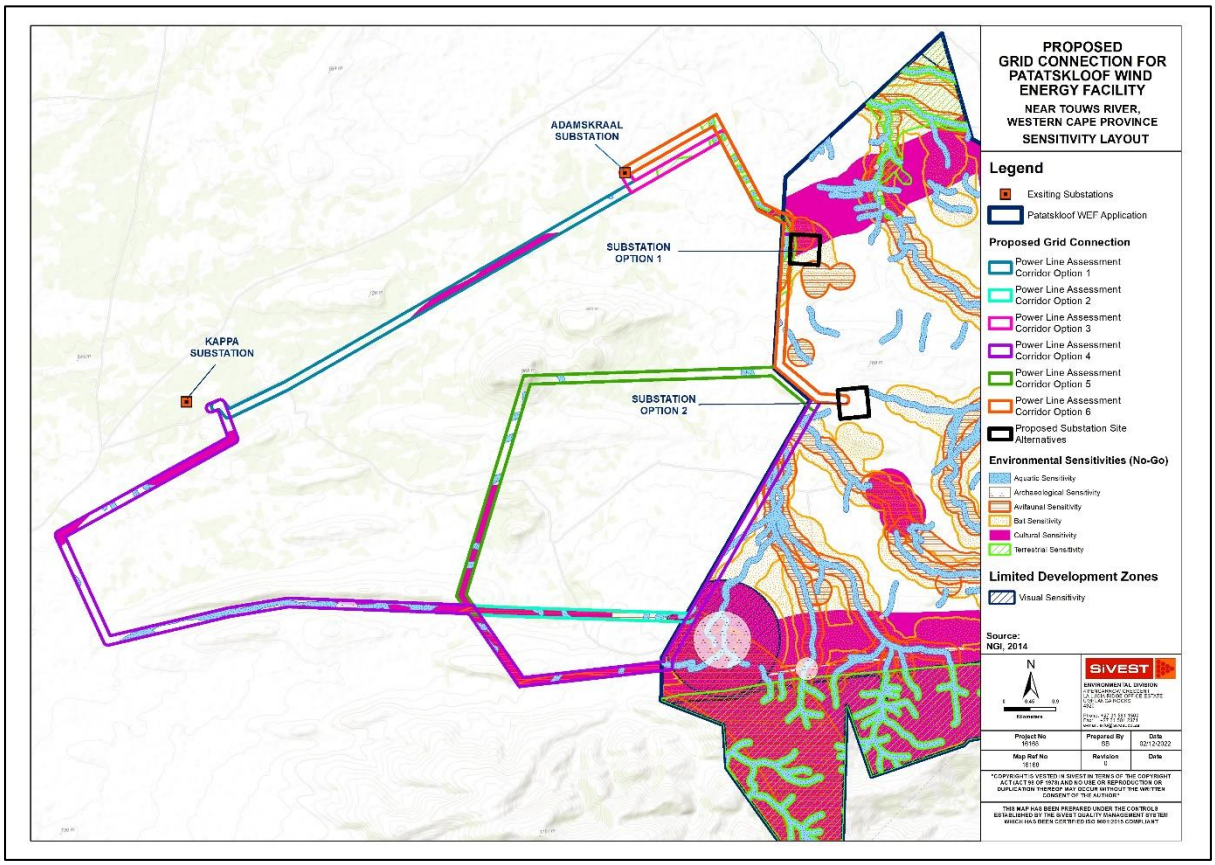


Figure 26: Proposed route alignments (individual routes alignment maps included in Appendix

The implementation of the Patatskloof Grid Infrastructure will assist expected growth in demand for installed power generation capacity. This in turn will assist with the increasing economic growth and social development within South Africa. Coupled with this, is the growing awareness of environmental impact, climate change and the need for sustainable development. At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. Wind is a free and infinite resource that occurs naturally in the environment.

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding. In light of this, it is the EAP's reasoned opinion that authorisation be granted and that the preferred route alignment being proposed as part of this BA process also be authorised (provided there are no concerns raised during the public participation process).

The following specialist studies have been undertaken for the project:

- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Bat Impact Assessment
- Biodiversity Impact Assessment

- Heritage Impact Assessment
    - Paleontological Impact Assessment
    - Archaeological Assessment
    - Cultural Landscape Assessment
- Geotechnical Assessment (desktop)
- Noise Impact Assessment
- Social Impact Assessment (desktop)
- Surface Water Impact Assessment
- Transportation Impact Assessment
- Visual Impact Assessment

A summary of the main findings of the specialists are included in **Section 16** above.

The **agricultural assessment** (refer to **Appendix 6**) concluded that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site and is therefore acceptable. This is substantiated by the facts that the land is of very limited land capability and is not suitable for the production of cultivated crops, the amount of agricultural land loss is within the allowable development limits prescribed by the agricultural protocol, the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits, and that the proposed development poses a low risk in terms of causing soil degradation. From an agricultural impact point of view, the specialist recommended that the development be approved and that the approval is not subject to any conditions.

The **avifaunal assessment** (refer to **Appendix 6**) concluded that the proposed Patatskloof WEF grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. Out of the six (6) grid corridor alternatives, Corridor Option 3 and Corridor Option 6 are most preferred from an avifaunal perspective. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

Based on the findings of the **terrestrial and the aquatic assessment** (refer to **Appendix 6**), the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. Lastly no preference is provided with regard the grid connections, as it assumed based on the characteristics of the site, that all the aquatic systems could be spanned, while making use of existing tracks.

According to the **geotechnical assessment** undertaken for the project (refer **Appendix 6**), no fatal flaws or sensitivities have been identified within or close to the grid corridors. It is therefore recommended that the proposed activity be authorised.

According to the **archaeological impact assessment** (refer to **Appendix 6**), the overall impact of the Patatskloof Grid, on the heritage resources, is seen as acceptably **low** after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorized.

The **cultural impact assessment** (refer to **Appendix 6**) concluded that the substation and gridline locations require some layout alteration to accommodate the CBA. With the recommended buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Patatskloof grid connection and infrastructure can be reduced from very high to moderate.

There are no fatal flaws and the development can proceed with CLA recommendations and mitigation in place.

The **palaeontological report** (refer to **Appendix 6**) concluded that the proposed Patatskloof grid connection development is not fatally flawed and, on condition that the recommended mitigation measures are included within the EMPr and implemented in full, there are no objections on palaeontological heritage grounds to their authorization.

According to the **social impact assessment** (refer to **Appendix 6**), considering all social impacts associated with the project, it is evident that, at the social level, the positive elements outweigh the negative and that the project carries with it a significant social benefit at a national level and is therefore supported. In addition, no compelling preference emerges in respect of the alternatives and it would be socially acceptable for the authorisation of either power line alternative.

According to the **transportation assessment** (refer to **Appendix 6**), the Patatskloof grid infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures proposed are implemented, and hence the Environmental Authorisation (EA) should be granted for the BA application.

The **visual impact assessment** (refer to **Appendix 6**) concluded that the potential visual impacts associated with the proposed Patatskloof grid infrastructure development are negative and of moderate significance. Given the low level of human habitation and the relative absence of sensitive receptors, the project is deemed acceptable from a visual perspective and the EA should be granted. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

Section 16 provides a summary of the positive and negative impacts associated with the proposed project.

19. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) AND CONDITIONS TO BE INCLUDED IN THE EA

In accordance with Appendix 4 of the EIA Regulations, 2014 (as amended), an EMPr has been included within this BA. In March 2019, a generic EMPr relevant to an application for environmental authorisation for substations and overhead transmission and distribution electricity transmission infrastructure developed within or outside of the strategic transmission corridors was published in Government Notice No. 435 in Government Gazette No, 42323. The generic EMPr for the on-site substation has therefore been prepared accordingly (**Appendix 8**). The generic EMPrs includes the impact management measures formulated by the various specialists and the recording of the proposed impact management outcomes for the development have also been included in the generic EMPrs (**Appendix 8**).

The EMPrs provides suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored. The relevant management plans have also been incorporated into the generic EMPrs (where required), which will assist in this regard. Taking into account the potential negative and significant positive impacts that the proposed development could have on the biophysical and social environment, it is the opinion of the

EAP that the proposed development should be authorised subject to the following conditions of authorisation:

- All of the mitigation measures identified in this BA Report (**Section 15.1**) must be included in the EMPr.
- It is important that all of the listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance.
- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Final Environmental Management Programme (EMPr) and implemented, where applicable;
- The specialist recommendations included in **Section 16** must be made conditions of the authorisation.
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

20. ASPECTS WHICH WERE CONDITIONAL TO THE FINDINGS OF THE ASSESSMENT EITHER BY THE EAP OR SPECIALIST WHICH ARE TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

None.

21. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE

The assessment has been based by SiVEST on information sourced and provided by the Applicant, site visits conducted, specialist findings and the application of the SiVEST assessment criteria. The EAP is of the opinion that the assessment method applied is acceptable. SiVEST assumes that:

- All the information provided by the Applicant is accurate and unbiased.
- The available data, including Topocadastral maps, Orthophotographs, geological maps and Google Earth images, are reasonably accurate.
- All information contained in the specialist studies provided is accurate and unbiased.
- Refer to specialist studies (**Appendix 6**) for their specific assumptions and limitations.
- It is not always possible to involve all Interested and/or Affected Parties (I&APs) individually, however, every effort has/will be made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to these associations / parties.
- It is not possible to determine the actual degree of the impact that the development will have on the immediate environment without some level of uncertainties. Actual impacts can only be determined following construction and/or operation commences.
- SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) for the surrounding developments. However, many of the documents

are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

22. AUTHORISATION OF THE PROPOSED PATATSKLOOF GRID PROJECT

The final route alignment for the Patatskloof WEF has been designed to avoid no-go features on site that have been identified through the various specialist studies that have been undertaken. The results of the specialist assessments have indicated that all alternatives (including the preferred alternative) contain no fatal flaws that should prevent the proposed project from proceeding.

Based on the findings of the specialist studies and this assessment, provided further comments and concerns are not raised during the pending public participation process, the EAP has no reason to recommend that the project not be authorised, provided that the mitigation measures are adhered to. The conditions to be included in the Environmental Authorisation for the construction phase are listed in **Section 19** above. The environmental authorization should be valid for a period of 5 to 10 years.

23. EAP DECLARATION

The EAP declarations, CV's and qualifications for the EAP's responsible for the preparation of this report have been attached in **Appendix 1**.

24. INFORMATION REQUIRED BY THE CA (IF APPLICABLE)

Currently n/a.

25. CONCLUSION

This Basic Assessment Report has covered activities and findings related to the BA process for the proposed Patatskloof Substation and Grid Project. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project.

There is no guarantee that all the potential impacts arising from the proposed project have been identified within the Basic Assessment phase, however the report provides an outline of the established measures that were taken to best identify all the potential impacts.

26. WAY FORWARD

The Draft Basic Assessment Report is currently being circulated for public participation for a period of 30 days (excluding public holidays) **05 December 2022** to **26 January 2023** (excluding the period **15** December 2022 to **5 January** 2023).

All comments received will be responded to in a C&RR, which will be included prior to submission of the Final Basic Assessment Report (FBAR) to the decision-making authority, namely the DFFE. Comments received on the report will be taken into consideration, incorporated into the report (where applicable) and will be used when compiling the FBAR.

Once the FBAR has been submitted and the DFFE have acknowledged receipt thereof, a decision to either grant or refuse the EA for the proposed development will be made by the DFFE. In addition, once a decision regarding the EA has been received from the DFFE, it will be made available to the public and all registered I&APs, stakeholders and OoS / authorities will be notified accordingly and provided details regarding the appeal process. The BA process will thus come to an end once appeals (if any) have been dealt with adequately and the appeal process closes.

All I&APs and key stakeholders are invited to register as I&APs in order to be kept informed throughout the process. To register as an I&AP / stakeholder and/or to obtain additional information, please submit your name, contact details (telephone number, postal address and email address) and the interest which you have in the application to SiVEST Environmental Division, as per the details below:

Contact: Hlengiwe Ntuli
PO Box 2921, RIVONIA, 2128
☎ Phone: (011) 798 0600
E-mail: sivest_ppp@sivest.com
Fax: (011) 803 7272
Website: www.sivest.com

Please reference '*Patatskloof Grid'* in your correspondence, should your comments be project specific. SiVEST shall keep all registered I&APs / key stakeholders informed of the BA process.

SiVEST Environmental Division
2 Autumn Street,
Rivonia, Sandton, 2128
PO Box 2921, Rivonia, 2128
Gauteng, South Africa

Tel +27 11 798 0600
Email info@sivest.com
www.sivest.co.za

Contact Person: Rendani Rasivhetshele
Email: rendanir@sivest.com