




**SOUTH AFRICA MAINSTREAM RENEWABLE  
POWER DEVELOPMENTS (PTY) LTD**

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**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 Karee  
Wind Energy Facility, near Ceres in the  
Witzenberg Local Municipality, Cape  
Winelands District in the Western Cape  
Province**

**Draft Basic Assessment Report (DBAR)**

Issue Date:	05 December 2022
Revision no.:	3.0
Project No.	16168
DFFE Ref No.:	To be allocated

<b>Date:</b>	05 December 2022
<b>Document Title:</b>	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 Karee Wind Energy Facility (WEF), near Ceres in the Witzenberg Local Municipality, Cape Winelands District in the Western Cape Province: Draft Basic Assessment Report (DBAR)
<b>Revision Number:</b>	3.0
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<b>Signature:</b>	
<b>Client:</b>	South Africa Mainstream Renewable Power Developments (Pty) Ltd

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## KEY PROJECT INFORMATION

### TECHNICAL DETAILS:

Component	Description / Dimensions
Generation Capacity of Substation	33/132kV
Location	The proposed development is located approximately 12km and 20km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality.
Affected Properties	<ul style="list-style-type: none"> <li>• Farm Tierberg No 258; and</li> <li>• Farm Voetpads Kloof No 253.</li> </ul>
SG Codes	<ul style="list-style-type: none"> <li>• C0190000000023900000</li> <li>• C0190000000025300000</li> <li>• C0190000000025800000</li> </ul>
Area occupied by Substation	Up to approximately 12.5 hectares
Height of Substation	Height of substation will be confirmed during the final design stages of the substation, prior to construction commencing
Transformer Information	<ul style="list-style-type: none"> <li>▪ Will be a shared substation which will contain transformers for voltage step-up from medium voltage to high voltage.</li> <li>▪ 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</li> </ul>
Site Access	The proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 Western Cape Government (WCG) provincial Roads.
Grid Connection Information	<ul style="list-style-type: none"> <li>▪ One (1) new 11-33/132kV on-site substation, situated on a site occupying an area of up to approximately 2ha. This will be included within the 12.5 ha of the Eskom portion site. 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</li> <li>▪ One (1) new 132kV overhead power line connecting the on-site substation to Kappa Substation and thereby feeding the electricity into the national grid.</li> <li>▪ 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.</li> </ul>

The final design details of the proposed substation will become available during the detailed design phase of the proposed development before construction commences. All maps included in the report are included in Appendix 5.

# **SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD**

## **KAREE 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 Karee 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') (**Figure 1**). The overall objective of the proposed development is to feed the electricity generated by the proposed Karee WEF into the national grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), other government run procurement programmes or potential private offtake entities.

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 Karee On-site Switching / Collector Substation and associated 132kV Power Line. 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. The proposed development requires an EA from the National Department Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning - WC DEADP) as well as CapeNature will also be consulted.

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). All relevant legislation and guidelines will be consulted during the BA process and will be complied with at all times.

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:

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South Africa Mainstream Renewable Power Developments (Pty) Ltd  
Project No. 16168  
Description Karee Grid DBAR  
Revision No. 3.0

Prepared by:



Date: 05 December 2022

Page iv

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

Activity No(s):	Provide the relevant <b>Basic Assessment Activity(ies)</b> as set out in <b>Listing Notice 1</b> of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
11 (i)	<b>GN R. 327 (as amended) Item 11:</b> 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 <sup>2</sup> ) i.e. 12.5 ha for the IPP Portion and 12.5 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)	<b>GN R. 327 (as amended) Item 12:</b> The	The proposed development will entail the

	<p>development of:</p> <p>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<p>construction of grid infrastructure (including the IPP portion/ yard of the 33kV/132kV shared on-site substation and BESS) within the proposed project site which will have a physical footprint of approximately 100m<sup>2</sup> or more and may occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site.</p> <p>The infrastructure associated with the proposed development will avoid the surface water features / watercourses identified within the application site where possible, although some structures (such as internal site roads) will occur within some of the surface water features / watercourses identified within the application site and/or within 32m of some of the surface water features / watercourses identified within the application site.</p>
19	<p><b>GN R. 327 (as amended) Item 19:</b> 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;</p>	<p>The proposed development involves the construction of a grid infrastructure (including the IPP portion/ yard of the 33kV/132kV shared on-site substation and BESS) within the proposed project site.</p> <p>Although the buildable area has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal site roads to be constructed (as required) will need to traverse some of the identified surface water features / watercourses. In addition, during construction of these roads (as required), soil will need to be removed from some of the identified surface water features / watercourses.</p>
24 (ii)	<p><b>GN R. 327 (as amended) Item 24:</b> The development of a road -</p> <p>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>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.</p> <p>As such, the proposed development will involve the construction of new internal roads within the application site as well as</p>

		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)	<b>GN R. 327 (as amended) Item 27:</b> 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 12.5ha. 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 12.5 ha.
28 (ii)	<b>GN R. 327 (as amended) Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:  (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed development site is currently zoned for agricultural land use, and the area to be developed will be larger than 1ha.
56 (ii)	<b>GN R. 327 Item 56:</b> 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 <b>Scoping and EIA Activity(ies)</b> as set out in <b>Listing Notice 2</b> 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 <b>Basic Assessment Activity(ies)</b> as set out in <b>Listing Notice 3</b> 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)	<b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.  <b>i. Western Cape</b> 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.	<p><b>GN R. 324 (as amended) Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation</p> <p><b>i. Western Cape</b> ii. Within critical biodiversity areas identified in bioregional plans;</p>	The proposed development will transform more than 300m <sup>2</sup> 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 Karee WEF application site (part of a separate application).
14 (ii) (a) (c); i. i. (ff)	<p><b>GN R. 324 (as amended) Item 14:</b> The development of –</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs –</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p><b>i. Western Cape</b> 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;</p>	<p>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<sup>2</sup> or more. The proposed substation will occupy an area of up to approximately 2ha.</p> <p>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.</p> <p>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 Karee WEF application site (part of separate application).</p>
18 i. ii. (aa)	<p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>i. Western Cape</b> ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation</p>	<p>Internal roads are required within the buildable area 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.</p> <p>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</p>



		occur within the Western Cape Province, outside urban areas. In addition, the proposed development area contains indigenous vegetation.
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## DETAILS OF ALTERNATIVES CONSIDERED

There are several factors which are favourable for the placement of WEFs, power lines and substations at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, wind resource, site accessibility and current land use. The project site for the WEF, power lines and substation has been identified based on wind resource, grid connection suitability, competition, topography, land availability and site access.

Only two (2) site alternatives for the proposed development are being considered as the placement of the proposed substation is dependent on the location of the proposed Karee WEF.

### Substation

Two (2) substation site alternatives are being considered and comparatively assessed by the EAP and specialists as follows:

1. **Option 1:** The location of the 33kv portion/yard of the shared 33/132kV onsite substation is located near an existing gravel road, making access to the onsite substation easier. The associated grid connection route to the Kappa Main Transmission Substation is shorter i.e. approximately 8.5km – 10.5km in length (Preferred).
2. **Option 2:** The location of the 33kv portion/yard of the shared 33/132kV onsite substation is located central to the land parcel, thereby reducing the energy loss associated with the wind turbines. The associated grid connection route to the Kappa Main Transmission Substation is slightly longer i.e. approximately 10.4km to 11.4km in length.

### Grid Corridors

Two (2) 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.

## PUBLIC PARTICIPATION PROCESS TO BE UNDERTAKEN FOR THE EIA PHASE

The following will be undertaken during the Basic Assessment Phase:

- The I&AP database will be updated as and when necessary, during the execution of the BA.
- A 30-day period will be provided to IAPs to review the Draft BA Report. Copies of the Draft BA Report will be provided to the regulatory and commenting authorities as well. The Draft BA Report will also be available for download on a link to be provided.
- All parties on the IA&P database will be notified via email, sms or fax of the opportunity to review the Draft BA Report, the review period and the process for submitting comments on the report.

- All comments received from I&APs and the responses thereto will be included in the final BA Report, which will be submitted to DFFE.
- A Comments and Responses Report will be updated and included in the BA Report, which will record the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The Final BA report with all comments included will be submitted to DFFE for review and approval.
- All I&APs will be notified via email, sms or fax after having received written notice from DFFE on the final decision on the application. These notifications will include the process required to lodge an appeal, as well as the prescribed timeframes in which documentation should be submitted.

## POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED KAREE GRID

Impact	Pre-mitigation	Post-mitigation
<b>PLANNING</b>		
<b>Socio-economic</b>		
Corruption	Negative Medium	Negative Medium
<b>Archaeology</b>		
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.	Negative High	Negative Medium
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	Negative Medium	Negative Low
<b>Heritage</b>		
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.	Negative High	Negative Medium
Destruction or damage to previously unidentified archaeological or historical resources	Negative Medium	Negative Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Low	Negative Low
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape	Negative High	Negative Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Negative Very High	Negative Low
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Negative Very High	Negative 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.	Negative Very High	Negative Low
<b>Cultural Landscapes</b>		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	Negative High	Negative Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Negative Very High	Negative Medium
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Negative Very High	Negative 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.	Negative Very High	Negative Low
<b>Noise</b>		

Impact	Pre-mitigation	Post-mitigation
Light delivery vehicles moving around onsite.	Low	Low
<b>CONSTRUCTION</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Avifaunal</b>		
Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	Negative Medium	Negative Low
Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure.	Negative Low	Negative Low
<b>Agriculture</b>		
<b>Bat</b>		
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 dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in and on the foraging habitat of clutter and clutter-edge species	Negative Medium	Negative Low
Creating new habitat amongst the turbines which might attract bats. This includes buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	Negative Low	Negative Low
Construction noise, especially during night-time, as well as lighting disturbance.	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
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	Negative Low	Negative 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.	Negative Medium	Negative Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Negative Medium	Negative Low
<b>Transport</b>		
Increase in Traffic	Negative Medium	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Geotech</b>		

<b>Impact</b>	<b>Pre-mitigation</b>	<b>Post-mitigation</b>
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Negative Low	Negative Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Negative Low	Negative Low
<b>Aquatic/ Freshwater</b>		
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	Negative Low	Negative Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem service 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	Negative Medium	Negative 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	Negative Medium	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		

Impact	Pre-mitigation	Post-mitigation
Availability of community services	Negative Low	Positive Low
Cultural and historic resources	Negative Medium	Negative Medium
Social and community infrastructure	Negative Low	Negative Low
Annoyance, dust and noise	Negative Low	Negative Low
Crime and security	Negative Medium	Negative Low
Daily living patterns	Negative Low	Negative Low
Employment and business opportunities	Positive Low	Positive Low
Farming operations	Negative Low	Negative Low
Fire hazard	Negative Low	Negative Low
Hazard exposure	Negative Low	Negative Low
STDs, HIV and AIDS	Negative Medium	Negative Medium
Risk to livestock	Negative Low	Negative Low
Temporary influx of construction workers	Negative Low	Negative Low
Informal development and settlements	Negative Low	Negative Low
<b>Heritage (Palaeontology)</b>		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Negative Low	Negative Low
<b>Cultural Landscapes</b>		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	Negative High	Negative Low
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	Negative High	Negative Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Negative Very High	Negative Low
Integrity of local residents to continue their patterns of land use is degraded by the construction and decommissioning activities.	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.</li> <li>Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</li> </ul>	Negative Low	Negative Low

Impact	Pre-mitigation	Post-mitigation
<ul style="list-style-type: none"> <li>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.</li> </ul>		
<b>OPERATIONAL</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
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.	Negative Medium	Negative Low
<b>Agricultural - compliance statement</b>		
<b>Noise</b>		
Noises from operating wind turbines- Day	Negative Low	Negative Low
Noises from operating wind turbines- Night	Negative Medium	Negative Low
<b>Terrestrial Ecology</b>		
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Negative Medium	Negative Low
<b>Avifaunal</b>		
Mortality of priority species due to collisions with the wind turbines.	Negative Medium	Negative Low
Mortality of priority species due to electrocutions on the overhead sections of the internal 33kV cables.	Negative Medium	Negative Medium
Mortality due to collisions with the overhead sections of the internal 33kV cables.	Negative Medium	Negative Low
<b>Bat</b>		
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying species have predominantly been confirmed at the proposed Karee WEF site.	Negative High	Negative High
Bat fatality during migration. A limited number of calls like <i>Miniopterus natalensis</i> (Natal Long-fingered bat), a Near Threatened migration species, have been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	Negative Medium	Negative Low
Some calls like the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	Negative Medium	Negative Low
Bat mortality due to the attraction of bats to wind turbines (Horn, et al., 2008). Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	Negative Medium	Negative Low
Loss of habitat and foraging space during operation of the wind turbines.	Negative Medium	Negative Medium
Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	Negative High	Negative Medium
<b>Transport</b>		

<b>Impact</b>	<b>Pre-mitigation</b>	<b>Post-mitigation</b>
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Geotech</b>		
Increased erosion due to alteration of natural drainage	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Vulnerability of small enterprises	Negative Low	Negative Low
Land use	Negative Low	Negative Low
Livelihoods and ecosystem services	Negative Low	Negative Low
Blade glint (only applicable to WEF)	Negative Low	Negative Low
Electromagnetic field (EMFs)	Negative Low	Negative Low
Employment after construction	Negative Low	Negative Low
Shadow flicker (only applicable to WEF)	Negative Low	Negative Low
Transformation of the sense of place	Negative Medium	Negative Medium
Security of electricity supply	Positive High	Positive High
<b>Cultural Landscapes</b>		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	Negative High	Negative Low
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative High	Negative Medium
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	Negative Very High	Positive Medium
<b>Visual</b>		

Impact	Pre-mitigation	Post-mitigation
<p>The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</p> <p>The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.</p> <p>Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.</p> <p>The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.</p>	Negative Medium	Negative Medium
<b>DECOMMISSIONING</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Agriculture</b>		
<b>Aquatic/ Freshwater</b>		
<p>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.</p> <p>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</p>	Negative Medium	Negative Low
<b>Bat</b>		
Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	Negative Low	Negative Low
<b>Avifaunal</b>		
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Negative Low	Negative Low
Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Medium	Negative Low
<b>Geotech</b>		
Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Negative Low	Negative Low
Increased erosion due to ground disturbance during rehabilitation activities	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic- None Identified</b>		
<b>Noise</b>		
Decommissioning activities relating to removal of infrastructure and wind turbines, rehabilitation of disturbed areas	Negative Low	Negative Low
<b>Transport</b>		
Increase in Traffic	Negative Medium	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low



Impact	Pre-mitigation	Post-mitigation
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Heritage – None Identified</b>		
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.</li> <li>Decommissioning activities may be perceived as an unwelcome visual intrusion.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during decommissioning would expose bare soil (scarring) which could visually surrounding environment.</li> <li>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.</li> </ul>	Negative Low	Negative Low
<b>CUMULATIVE</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
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	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
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	Negative Low	Negative Low
<b>Agricultural</b>		
<b>Bat</b>		
Cumulative effect of destruction of active roost of several WEFs as well as features that could serve as potential roosts	Negative High	Negative Low
Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	Negative High	Negative High
Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several WEFs	Negative High	Negative Medium
Habitat loss over several WEFs	Negative High	Negative High
Cumulative reduction in the size, genetic diversity, resilience, and persistence of bat populations	Negative High	Negative High
<b>Avifaunal</b>		

Impact	Pre-mitigation	Post-mitigation
1. Mortality due to collisions with the wind turbines	Negative Medium	Negative Low
2. Displacement due to disturbance during construction and operation of the wind farm		
3. Displacement due to habitat change and loss at the wind farm		
4. Mortality due to electrocution on the electrical infrastructure		
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Vulnerability of small enterprises	Negative Medium	
Availability of community services	Negative Medium	
Cultural and historic resources	Negative Medium	
Land use	Negative Medium	
Livelihoods and ecosystem services	Negative Low	
Social and community infrastructure	Negative Low	
Annoyance, dust and noise	Negative Medium	
Blade glint	Negative Medium	
Crime and security	Negative Medium	
Daily living patterns	Negative Low	
Electromagnetic field (EMFs)	Negative Low	
Employment after construction	Negative Medium	
Employment and business opportunities	Positive Medium	
Farming operations	Negative Medium	
Fire hazard	Negative Medium	
Hazard exposure	Negative Medium	
Shadow flicker	Negative Medium	
STDs, HIV and AIDS	Negative High	
Risk to livestock	Negative Medium	
Transformation of the sense of place	Negative Medium	
Corruption	Negative Medium	
Security of electricity supply	Positive High	
Temporary influx of construction workers	Negative Medium	
Informal development and settlements	Negative Medium	
<b>Heritage (Archaeology)</b>		

Impact	Pre-mitigation	Post-mitigation
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Negative Medium	Negative Low
<b>Heritage (Palaeontology)</b>		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Negative Low	Negative Low
<b>Cultural Landscape</b>		
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Negative Very High	Negative Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Negative Very High	Negative Medium
<b>Noise</b>		
Cumulative noises due to operating wind turbines from other wind energy facilities in the area	Negative Low	Negative Low
<b>Transport</b>		
Increase in Traffic	Negative Medium	Negative Medium
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Medium
Increase in Dust from gravel roads	Negative Medium	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Medium	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Additional renewable energy 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.</li> <li>Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.</li> <li>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.</li> <li>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.</li> </ul>	Negative Medium	Negative Medium

## SPECIALIST STUDIES

The following specialist studies have been undertaken for the project:

South Africa Mainstream Renewable Power Developments (Pty) Ltd  
 Project No. 16168  
 Description Karee Grid DBAR  
 Revision No. 3.0

Prepared by:



Date: 05 December 2022

Page xix

Specialist Study	Findings	Recommendations
Biodiversity	<p>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.</p> <p>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 biodiversity even at great distance.</p> <p>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.</p>	<p>Based on the findings of this study, 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 systems could be avoided, while making use of existing tracks, however technical considerations have resulted in Substation Option 2 being selected. Further it is recommended that WTG 20 should be moved out of the Renosterveld / Fynbos area.</p> <p>However, this must still be considered once the roads layout has been provided, coupled to a micro-siting walkdown once this information is available.</p>
Aquatic	<p>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 on aquatic resources, but requiring the clearing of areas with terrestrial vegetation, especially when considering the associated roads, cables and other infrastructure.</p> <p>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, to 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.</p> <p>Overall, it is expected that the impact on the</p>	<p>Based on the findings of this study, 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, however technical considerations have resulted in Substation Option 2 being selected is supported as Option 1 is located within a watercourse.</p> <p>However, this must all still be assessed once the roads layout has been provided, coupled to a micro-siting walkdown once all information is available.</p>

Specialist Study	Findings	Recommendations
	<p>environment would be Low (-). 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.</p>	
Agricultural	<p>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.</p> <p>Three potential negative agricultural impacts were identified as follows: loss of agricultural land use, land degradation, and the impact of dust, but all are of low significance.</p> <p>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.</p>	<p>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.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved.</p> <p>The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than recommended mitigations provided.</p>
Avifaunal	<p>It is estimated that a total of 135 bird species could potentially occur in the broader area. Of these, 18 species are classified as priority species for wind development.</p> <p>The proposed Karee grid will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> <li>▪ Displacement of priority species due to disturbance linked to construction activities in the construction phase.</li> <li>▪ Displacement due to habitat transformation in the construction phase.</li> <li>▪ Collisions with the overhead line in the operational phase.</li> <li>▪ Displacement of priority species due to</li> </ul>	<p><u>High sensitivity: Line marking required</u></p> <ul style="list-style-type: none"> <li>▪ The PAOI contains confirmed habitat for species of conservation concern (SCC) as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). The occurrence of SCC was confirmed during the integrated pre-construction monitoring programme, with observations of Ludwig's Bustard, Southern Black Korhaan, Karoo Korhaan and Verreaux's Eagle recorded within the PAOI and its immediate surrounds. Based on the field surveys to date, a classification of High sensitivity for</li> </ul>

Specialist Study	Findings	Recommendations
	<p>disturbance linked to dismantling activities in the decommissioning phase.</p>	<p>avifauna in the screening tool is therefore appropriate. The appropriate mitigation measure would be to mark the entire line with Bird Flight Diverters.</p>
<p>Visual</p>	<p>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.</p> <p>Although the study area is not typically known for its tourism significance, the presence of several private nature and game reserves would suggest that the area does have some tourism appeal. There is however limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of thirty-three (33) potentially sensitive receptors were identified within the combined study area, although only nineteen (19) of these were found to be within the viewshed for the proposed WEF. Four (4) 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 Vaalkloof Private Nature Reserve. The remaining three (3) sensitive receptors would experience moderate levels of impact.</p> <p>Fifteen (15) 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 six (6) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. This sensitivity rating relates largely to the fact that these receptors are located in close proximity to the boundary of the Karee WEF application site and they are in zones of high contrast, with little natural screening present. Two of these receptors, namely VR22 and VR49 are in fact located within the proposed Karee WEF development area and as such, these properties</p>	<p>It is the specialist's opinion that the potential visual impacts associated with the proposed Karee WEF and associated 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.</p>

Specialist Study	Findings	Recommendations
	<p>form part of the WEF project. Thus it is assumed that the owners have a vested interest in the WEF project and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors.</p> <p>Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Karee WEF development.</p> <p>The only sensitive receptor (SR1) identified within 5km of the power line assessment corridors would experience only moderate levels of visual impact as a result of the proposed 132kV132kV power line associated with the Karee WEF development.</p> <p>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. Impacts resulting from the proposed new power line are however expected to be reduced by the presence of existing high voltage power lines already visible to these receptors. In addition, one of these receptors is VR22 which is located within the proposed WEF development area and as such, this property forms part of the WEF project. The remaining four (4) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line.</p> <p>Although the N1 and R356 receptor roads traverse the study area, wind turbines are only expected to be visible from the R356. Motorists travelling along this route are only expected to experience moderate impacts from the proposed Karee WEF and no impacts from the grid connection infrastructure are associated with the project.</p> <p>An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed <b>Karee WEF and associated grid connection</b> infrastructure will be of <b>low</b></p>	

Specialist Study	Findings	Recommendations
	<p><b>significance</b> during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.</p> <p>Although other proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Karee WEF project, it was determined that only four (4) of these would have any significant impact on the landscape within the visual assessment zone, namely Perdekraal East WEF, Perdekraal West WEF, Tooverberg WEF and Patatskloof WEF. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.</p>	
Transportation	<p>The traffic specialist doesn't foresee any major risks concerning the proposed development</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>• A new access position on Road DR01475 is proposed @ Km 72.80.</li> <li>• All external road upgrades require approval and a wayleave application from the Western Cape Department of Transport &amp; Public Works prior to work commencing.</li> <li>• Mitigation measures to be included in the construction / BoP phase: <ul style="list-style-type: none"> <li>○ Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods;</li> <li>○ Stagger material, component and abnormal loads deliveries;</li> <li>○ Adequate road signage on all external roads carrying development traffic according to the South African Road Traffic Sign Manual (SARTSM);</li> <li>○ Reduction in speed of vehicles;</li> <li>○ Adequate enforcement of the law;</li> <li>○ Implementation of pedestrian safety initiatives;</li> <li>○ Regular maintenance of farm fences &amp; access cattle grids;</li> <li>○ Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20);</li> <li>○ Implement a road maintenance program under the auspices of the respective transport department; and</li> </ul> </li> </ul>



Specialist Study	Findings	Recommendations
		<ul style="list-style-type: none"> <li>○ Possible use of an approved dust suppressant techniques.</li> <li>• A more comprehensive route analysis be completed prior to construction in order to get a better understanding of the works required and the potential risks.</li> <li>• The 'No Go' alternative would result in there being no transportation impacts.</li> <li>• No fatal flaws or preferences were identified for any of the proposed site alternatives, construction laydown areas, substation locations or Power line routes.</li> <li>• No environmentally sensitive areas have been identified and therefore no areas are to be avoided from a Transportation perspective.</li> </ul> <p>It is the traffic specialist opinion that the that the Karee Wind Energy Facility and associated grid infrastructure will have a nominal impact on the existing traffic network.</p> <p>The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures in this report are implemented, and hence the Environmental Authorisations (EAs) should be granted for the BA applications.</p>
Heritage – Archaeological	<p>A total of two (2) structures were identified, including one farmstead and a one-roomed stone structure.</p> <p>The farmstead (Karee_10) was rated as having medium heritage significance and the other structure (Karee_11) was rated as having low heritage significance.</p> <p>A total of fourteen (14) archaeological site were identified, including one (1) site with LSA flakes and OES, one (1) rock shelter with rock art and flakes, one (1) site with LSA flakes and the remains of a stone structure, one (1) site with a pebble deposit with various artefacts, one (1) site with ESA, MSA and LSA artefacts (incl. Fauresmith), one (1) site with LSA structures and deposit and eight (8) findspots.</p> <p>Two (2) archaeological sites (Karee_6, Karee_18) were rated as having high heritage significance, two (2) archaeological sites (Karee_12, Karee_15) were rated as having medium heritage significance and two (2)</p>	<p>This report confirms that the impact of the new Karee WEF and associated 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 EMP, will mitigate possible impacts on unidentified heritage resources.</p> <p>An assessment of the final footprint of the new Karee WEF and associated grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMP.</p> <p><b>The following mitigation measures will be required:</b></p> <ul style="list-style-type: none"> <li>▪ An archaeological walk down of the final approved layout will be required before construction commences;</li> <li>▪ Implement a 50-meter buffer around the structure at <b>Karee-11</b>.</li> <li>▪ Implement a 50-meter buffer around all archaeological site with a rating of IIIB and</li> </ul>

Specialist Study	Findings	Recommendations
	<p>archaeological sites (Karee_2, Karee_8) were rated as having low heritage significance.</p> <p>Eight (8) findspots (Karee_1, Karee_3, Karee_4, Karee_9, Karee_14, Karee_16, Karee_17, Karee_19) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.</p>	<p>higher.</p> <ul style="list-style-type: none"> <li>▪ Implement a 500-meter buffer around the farmstead site at <b>Karee_10</b>.</li> <li>▪ Implement a 200-meter buffer around the rock art site at <b>Karee_6</b>.</li> <li>▪ Demarcate the resources rated as III C-III A no-go areas.</li> <li>▪ A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.</li> <li>▪ 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.</li> </ul>
Heritage Cultural	<p>– 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 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 Komsberg area, notably the proposed RE developments included in the cumulative impact section of this report.</p> <p>Conservation: to protect the natural resources (water, air, land, sand, fishes, etc.), ecosystems (reefs, fynbos), biological abundance (flora and fauna), landscapes and the local culture.</p> <p>Development: to protect social and economic progress, without damaging or depleting the natural resources (sustainable development).</p> <p>The findings of this report, coupled with the proposed layout for development of wind turbines, which considers appropriate placement</p>	<p>The conclusion of this CLA study has culminated in the map (Figure 1 of the CLA Report) showing location of proposed turbines and WEF infrastructure with the following heritage indicators and development buffers:</p> <ul style="list-style-type: none"> <li>▪ Landscape unit C is suitable for sensitive WEF infrastructure development;</li> <li>▪ A 500m buffer to either side of the district road for turbine and other infrastructure placement (Karee WEF does not propose turbines within this buffer) – due to existing gridlines within this road buffer, proposed option 1 for new gridlines is acceptable in its placement;</li> <li>▪ 300m buffer to either side of identified significant historic farm roads for turbine placement, substation and laydown areas;</li> <li>▪ 1000m buffer around historic farmsteads (red circles) for turbine placements; and</li> <li>▪ 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 and no WEF roads running through farmstead complexes;</li> <li>▪ 200m freestanding graded heritage structure buffer for new roads and infrastructure;</li> <li>▪ 100m buffer from cemetery or unmarked burial for all development;</li> <li>▪ 400m buffer around water management bio-cultural landscape elements (blue circles);</li> <li>▪ existing roads to be used with minimal upgrade as far as possible;</li> <li>▪ riverine corridors 100yr flood line buffer</li> </ul>

Specialist Study	Findings	Recommendations
	<p>in terms of wind energy capacity, concludes that the development can be permitted within the site if the report's recommendations are followed.</p> <p>The mitigating recommendations in this report consider the ecological, aesthetic, historic and socio-economic value lines that underpin the layers of significance that combine to create the character of the place and the cultural landscape of the Ceres Karoo. These recommendations include road and farmstead complex buffers which incorporate cultivated areas and graves, steep slope and ridgeline no-go areas as well as consideration of the unique land form of the site, CBA and ESA no-go areas, as well as mechanisms to support the non-landowner residents that live on the site in being bale to continue their indigenous land use patterns, knowledge and social systems. These mitigations will reduce the impact on the surrounding landscape and heritage resources but due to the high visual impact of the turbines, largely a result of their height, the negative impact to the cultural landscape cannot be removed, only reduced from very high to moderate.</p>	<p>(ecological) or 100m buffer (archeological) whichever is further (buffers not indicated).</p> <ul style="list-style-type: none"> <li>▪ CBA and ESA no-go areas for all development (green shading – turbines 27 and 31), unless otherwise recommended by the biodiversity and environmental specialist studies for this site;</li> <li>▪ Should any development be proposed for the CBAs or river drainage lines, a survey for potential historic sites will need to be completed before such development commences;</li> <li>▪ Voetpads kloof gateway buffer included in the 300m farm road buffer and unit A.</li> <li>▪ Further, the following changes to the current proposed layout is recommended:</li> <li>▪ 20 current proposed turbine placements (red) have been found unsuitable for their negative impacts but could be accommodated in landscape unit D where appropriate;</li> <li>▪ Proposed substation sites should be relocated to slopes less than 3%;</li> <li>▪ Proposed gridlines should be accommodated outside of the 500m district road buffer as far as possible.</li> </ul>
Heritage – Paleontological	<p>No palaeontological High Sensitivity or No-Go areas have been identified within the WEF, BESS 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.</p> <p>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 <i>positive</i> impact).</p> <p>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 <b>LOW</b> (<i>negative</i>) with and without mitigation. It is concluded that, as far as fossil heritage resources are concerned, the proposed</p>	<p><b>Recommended mitigation:</b></p> <ol style="list-style-type: none"> <li>(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 <i>etc</i>) being found or unearthed during the construction phase of the development.</li> <li>(2) Monitoring for fossil material of all major surface clearance and deeper (&gt; 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended.</li> <li>(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.</li> <li>(4) A protocol for Chance Fossil Finds is appended to this report (Appendix 3). These recommendations must be included within the Environmental Management Programmes (EMPrs) for the Karee WEF, BESS and grid connection developments.</li> </ol>

Specialist Study	Findings	Recommendations
	<p>Karee WEF, BESS 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 <i>provided that</i> 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.</p> <p>There are no fatal flaws in the Karee WEF, BESS and grid development proposals as far as fossil heritage is concerned. Provided that the recommended palaeontological monitoring and mitigation measures are followed through, residual impacts for the Karee WEF, BESS and grid projects are rated as <b>LOW</b>. There are no objections on palaeontological heritage grounds to authorization of the proposed Karee WEF and the associated grid connection.</p>	
Geotechnical	<p>The assessment area is underlain by rock units of Dwyka Group and 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 transported (alluvium and scree) 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.</p> <p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective.</p>	<p>The proposed developments are assessed to have a "Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation" provided that the recommended mitigation measures are implemented.</p> <p>These include avoiding development on the steeper sections of the site. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practice.</p> <p>Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report.</p>
Social	<p>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" 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</p>	<p>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.</p>

Specialist Study	Findings	Recommendations
	<p>ambitious emissions target and is suggesting changes to the country's energy plan.</p> <p>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.</p>	

## ENVIRONMENTAL IMPACT STATEMENT

Mainstream is proposing to construct grid connection infrastructure. The overall objective of the proposed development is to feed the electricity generated by the proposed Karee WEF into the national grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), other government-run procurement programmes or potential private offtake entities. The proposed Karee grid will comprise of one (1) new 33/132kV on-site substation as well as one (1) new associated 132kV overhead power line for the proposed Karee Wind Energy Facility (WEF) (part of a separate Basic Assessment (BA) process).

The implementation of the Karee 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 the 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.

The following specialist studies have been undertaken for the project:

- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Biodiversity Impact Assessment
- Heritage Impact Assessment
  - Paleontological Impact Assessment
  - Archaeological Assessment
  - Cultural Landscape Assessment
- Geotechnical Assessment (desktop)
- 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 17** 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 Karee grid development will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The alternative substation and laydown locations are all situated in essentially the same habitat, i.e., Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. No fatal flaws were discovered in the course of the onsite investigations. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

The **aquatic assessment and terrestrial assessment** (refer to **Appendix 6**) revealed that there is no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. The specialist has no preference with regard to 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, however technical considerations have resulted in Substation Option 2 being selected is supported as Option 1 is located within a watercourse.

According to the **geotechnical assessment** undertaken for the project (refer **Appendix 6**), no fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. However further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report. The impact of the WEF was found to be negative low impact as the anticipated impact will have negligible negative effects and will require little to no mitigation provided that the recommended mitigation measures are implemented. The site from a desktop level geotechnical study perspective is considered suitable for the proposed WEF and the specialist therefore recommended that the proposed activity be authorised.

According to the **archaeological impact assessment** (refer to **Appendix 6**), the overall impact of the Karee grid project, 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**) recommended that the substation and gridline locations require some layout alteration to accommodate slope topography, historic district road and view shed to Tooverberg and Pramberg. With these buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Karee 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 Karee grid connection developments are 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.

According to the **transportation assessment** (refer to **Appendix 6**), the Karee Wind Energy Facility and associated 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 Karee WEF and associated 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. SiVEST 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.

Based on the findings of the specialists, the potential impacts identified, the route alignment has been updated to avoid environmental sensitivities where possible to produce a draft layout. No further layout alternatives have been considered as part of the BA process. Impact assessments have been undertaken on the revised layout. No technology alternatives will be considered.

It is trusted that the DBAR provides adequate information to the I&APs / stakeholders to provide input and for the competent authority to make an informed decision regarding the proposed development. It should be noted that this section is deemed to be in line with the requirements of Appendix 1 of the EIA Regulations 2014, as amended, and contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

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South Africa Mainstream Renewable Power Developments (Pty) Ltd  
Project No. 16168  
Description Karee Grid DBAR  
Revision No. 3.0

Prepared by:



Date: 05 December 2022

Page xxxii



**SOUTH AFRICA MAINSTREAM RENEWABLE POWER  
DEVELOPMENTS (PTY) LTD**

**KAREE GRID INFRASTRUCTURE**

**DRAFT BASIC ASSESSMENT REPORT**

**TABLE OF CONTENTS**

<b>1.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Content Requirements for a Basic Assessment Report.....	4
<b>2.</b>	<b>PROJECT TITLE .....</b>	<b>6</b>
<b>3.</b>	<b>DETAILS OF APPLICANT.....</b>	<b>7</b>
3.1	Name and contact details of the Applicant .....	7
<b>4.</b>	<b>DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS .....</b>	<b>7</b>
4.1	Name and contact details of the Environmental Consultant .....	7
4.2	Names and expertise of the Environmental Assessment Practitioner (EAP) .....	7
4.3	Names and expertise of the specialists.....	8
<b>5.</b>	<b>LOCATION OF THE ACTIVITY .....</b>	<b>9</b>
5.1	21 Digit Surveyor General Codes of the site .....	10
5.2	Coordinates of the site .....	11
<b>6.</b>	<b>SITE LAYOUT/ ROUTE ALIGNMENT PLAN .....</b>	<b>12</b>
<b>7.</b>	<b>ACTIVITY INFORMATION.....</b>	<b>12</b>
7.1	Project Description.....	12
7.1.1	<b>Grid and Associated Infrastructure .....</b>	<b>12</b>
7.2	NEMA Listed Activities.....	15
<b>8.</b>	<b>NATIONAL WEB BASED ENVIRONMENTAL SCREENING TOOL.....</b>	<b>19</b>
<b>9.</b>	<b>DESCRIPTION OF THE RECEIVING ENVIRONMENT.....</b>	<b>21</b>

9.1	Geographical .....	21
9.2	Land Use .....	22
9.3	Climate .....	23
9.4	Topography .....	23
<b>9.5</b>	<b>Agricultural.....</b>	<b>24</b>
9.6	Geology and Soils.....	26
9.7	Geohydrology .....	26
9.8	Surface Water.....	27
9.9	Biodiversity .....	32
9.9.1	Vegetation and flora .....	33
9.9.2	Fauna.....	36
9.10	Avifauna.....	40
<b>9.10.1</b>	<b>Findings and Assessment .....</b>	<b>40</b>
<b>9.10.2</b>	<b>Summary and Conclusion .....</b>	<b>41</b>
<b>10.</b>	<b>DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT .....</b>	<b>42</b>
10.1	Socio economic characteristics .....	42
10.1.1	Cape Winelands District Municipality .....	42
10.1.2	Witzenberg Local Municipality .....	43
10.2	Cultural/Historical Environment.....	44
10.2.1	Archaeological .....	44
10.2.2	Cultural Landscape.....	45
10.2.3	Palaeontological .....	48
10.3	Transport .....	50
10.4	Visual.....	51
<b>11.</b>	<b>POLICY AND LEGISLATIVE CONTEXT.....</b>	<b>51</b>
11.1	The Constitution.....	51
11.2	National Environmental Management Act (107 of 1998) .....	52
11.3	Environmental Impact Assessment (EIA) Guideline for Renewable Energy Projects, DFFE Notice 989 of 2015.....	53
11.4	National Water Act (Act 36 of 1998).....	53
11.5	The National Heritage Resources Act 1999 (25 of 1999) .....	54
11.6	National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004, as amended).....	55
11.7	National Environmental Management: Protected Areas Act, 2003 (Act No.57 of 2003 as amended).....	56

11.8	National Forests Act (NFA) (Act No. 84 of 1998).....	56
11.9	National Veld and Forest Fire Act (Act No. 101 of 1998).....	57
11.10	Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) .....	57
11.11	National Road Traffic Act (NRTA) (Act No. 93 of 1996, as amended) .....	58
11.12	Civil Aviation Act (CAA) (Act No. 13 of 2009).....	58
11.13	Astronomy Geographic Advantage Act (Act No. 21 of 2007).....	58
11.14	National Energy Act (Act No. 34 of 2008).....	59
11.15	Electricity Regulation Act (Act No. 4 of 2006).....	59
11.16	Protection of Public Information Act (Act No. 4 of 2013).....	60
11.17	Renewable Energy Development Zones (REDZs) and Strategic Transmission Corridors.....	60
11.18	Additional Relevant Legislation .....	61
<b>12.</b>	<b>KEY DEVELOPMENT STRATEGIES AND GUIDELINES .....</b>	<b>62</b>
12.1	Western Cape Strategic Plan 2019 - 2024 .....	63
12.1.1	The Western Cape Spatial Development Framework (SDF) 2014 .....	63
12.2	Cape Winelands District Municipality Integrated Development Plan, 2022/23 – 2026/27.....	64
12.2.1	Witzenberg Local Municipality Integrated Development Plan (2013 – 2016) .....	64
<b>13.</b>	<b>NEED AND DESIRABILITY .....</b>	<b>64</b>
<b>13.1</b>	<b>National Renewable Energy Commitment.....</b>	<b>66</b>
<b>13.2</b>	<b>Wind Power Potential in South Africa and Internationally .....</b>	<b>67</b>
<b>13.3</b>	<b>Site Suitability .....</b>	<b>67</b>
<b>13.4</b>	<b>Reduced dependency on fossil fuels .....</b>	<b>68</b>
<b>13.5</b>	<b>Stimulate the economy.....</b>	<b>68</b>
<b>13.6</b>	<b>Job opportunities and household livelihoods .....</b>	<b>69</b>
<b>13.7</b>	<b>Skills development .....</b>	<b>69</b>
<b>13.8</b>	<b>Proximity to substation .....</b>	<b>70</b>
<b>14.</b>	<b>DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION.....</b>	<b>70</b>
14.1	Details of alternatives.....	70
14.1.1	Introduction .....	70
14.1.2	Location/Site alternatives .....	71
14.1.3	Activity/technology alternatives .....	71
14.1.4	Design or Layout alternatives .....	72

14.1.5	No – go option .....	72
14.1.6	Comparative Assessment of Alternatives.....	73
14.2	Motivation and concluding statement for preferred alternative .....	65
14.3	Public Participation Process undertaken.....	66
14.3.1	Identification of Key Stakeholder and I&AP's .....	66
14.3.2	Responsibilities of interested and affected parties (I&AP's).....	66
14.3.3	Steps taken to notify key stakeholders and potential I&APs .....	66
14.3.4	Summary of issues raised .....	67
14.3.5	Details of notification of landowners.....	67
14.3.6	Details of notification of Organs of State .....	67
<b>15.</b>	<b>IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE .....</b>	<b>67</b>
<b>15.1</b>	<b>Planning .....</b>	<b>74</b>
<b>15.2</b>	<b>Construction .....</b>	<b>83</b>
<b>15.3</b>	<b>Operation.....</b>	<b>91</b>
<b>15.4</b>	<b>Decommissioning.....</b>	<b>98</b>
<b>15.5</b>	<b>Cumulative .....</b>	<b>101</b>
<b>16.</b>	<b>POSITIVE AND NEGATIVE IMPACTS OF THE KAREE GRID PROJECT ....</b>	<b>75</b>
16.1	Mitigation measures.....	84
<b>17.</b>	<b>SUMMARY OF SPECIALIST FINDINGS AND RECOMMENDATIONS.....</b>	<b>85</b>
<b>18.</b>	<b>ENVIRONMENTAL IMPACT STATEMENT.....</b>	<b>95</b>
<b>19.</b>	<b>ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR) AND CONDITIONS TO BE INCLUDED IN THE EA.....</b>	<b>98</b>
<b>20.</b>	<b>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.....</b>	<b>99</b>
<b>21.</b>	<b>UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE .....</b>	<b>99</b>
<b>22.</b>	<b>AUTHORISATION OF THE PROPOSED KAREE GRID PROJECT .....</b>	<b>100</b>
<b>23.</b>	<b>EAP DECLARATION.....</b>	<b>100</b>

<b>24.</b>	<b>INFORMATION REQUIRED BY THE CA (IF APPLICABLE).....</b>	<b>100</b>
<b>25.</b>	<b>CONCLUSION .....</b>	<b>100</b>
<b>26.</b>	<b>WAY FORWARD .....</b>	<b>101</b>

## **APPENDICES**

Appendix A:	CV's of EAP's involved in the process and EAP declaration
Appendix B:	Locality Map
Appendix C:	Site Development Plan
Appendix D:	Photographs
Appendix E:	Proof of public participation
Appendix F:	Specialist studies and declarations
Appendix G:	SiVEST Impact Rating System
Appendix H:	EMPr
Appendix I:	Other

## **LIST OF FIGURES**

<b>Figure 1: Karee Grid Regional Context .....</b>	<b>2</b>
<b>Figure 2: Site locality .....</b>	<b>10</b>
<b>Figure 3: Preliminary route alignment layout .....</b>	<b>13</b>
<b>Figure 4: Conceptual WEF electricity generation process showing electrical connections .....</b>	<b>14</b>
<b>Figure 5: Regional context .....</b>	<b>22</b>
<b>Figure 6: Land Cover Classification .....</b>	<b>23</b>
<b>Figure 7: Topography .....</b>	<b>24</b>
<b>Figure 8: Agricultural sensitivity as given by the screening tool (green = low; yellow/orange = medium; red = high; dark red = very high).....</b>	<b>25</b>
<b>Figure 9: Geology (Extract of 1:250000 scale Geological Map 3320 Ladysmith and 3319 Worcester- Gage Consulting).....</b>	<b>26</b>
<b>Figure 10: Project locality map indicating the various quinary catchments and mainstem rivers (Source DWS and NGI) within the project boundary .....</b>	<b>28</b>
<b>Figure 11: A broad watercourse with defined riparian zone associated with a tributary of the Kolkies River, that bisects the study area .....</b>	<b>29</b>
<b>Figure 12: Sandy / pebble alluvial channel associated with the upper reaches of the Kolkies River that will be traversed by internal access roads .....</b>	<b>29</b>
<b>Figure 13: Delineated aquatic zones and respective sensitivities .....</b>	<b>30</b>
<b>Figure 14: Habitat sensitivity map (with no-go identified in red) .....</b>	<b>32</b>
<b>Figure 15: National Vegetation Map as per Mucina and Rutherford (2007) amended National Spatial Biodiversity Assessment (NSBA) 2018 .....</b>	<b>33</b>
<b>Figure 16: Aerial view of central portion of the site looking south.....</b>	<b>34</b>

<b>Figure 17: Habitat transition within the site, dominated by sparsely vegetated shale / quartzite plans .....</b>	<b>34</b>
<b>Figure 18: Vegetation units at a finer scale .....</b>	<b>35</b>
<b>Figure 19: Critical Biodiversity Areas.....</b>	<b>36</b>
<b>Figure 20: One of the many Angulate tortoises (Chersina angulata) observed on site that had succumbed to the previous drought conditions .....</b>	<b>38</b>
<b>Figure 21: Another common siting within the region, namely the Puffadder (Bitis arietans arietans), with two (2) sited during the assessment on site .....</b>	<b>38</b>
<b>Figure 22: Habitat sensitivity map inclusive of terrestrial and aquatic habitats ...</b>	<b>39</b>
<b>Figure 23: Location of the Cape Winelands District in relation to other District Municipalities (Cape Winelands Integrated Development Plan (IDP), Draft 5<sup>th</sup> Generation IDP 2022/23 – 2026/27) .....</b>	<b>42</b>
<b>Figure 24: Locality of the heritage resources identified within the study area.....</b>	<b>44</b>
<b>Figure 25: Cultural landscape assessment heritage indicators and buffers .....</b>	<b>48</b>
<b>Figure 26: Paleontological sensitivity map for the Karee WEF, BESS and grid connection project areas.....</b>	<b>50</b>
<b>Figure 27: Preliminary Layout showing the substation locations and power line corridors .....</b>	<b>74</b>
<b>Figure 28: Preferred layout being put forward for approval .....</b>	<b>65</b>
<b>Figure 29: Final proposed route alignment with site sensitivities .....</b>	<b>95</b>

## **LIST OF TABLES**

<b>Table 1: Content requirements for a Basic Assessment Report.....</b>	<b>4</b>
<b>Table 2: Name and contact details of the applicant .....</b>	<b>7</b>
<b>Table 3: Name and contact details of the Environmental Consultant who prepared the report .....</b>	<b>7</b>
<b>Table 4: Names and details of the expertise of the EAP’s involved in preparing this report .....</b>	<b>7</b>
<b>Table 5: Names of specialists involved in the project .....</b>	<b>8</b>
<b>Table 6: 21 Digit Surveyor General Code .....</b>	<b>10</b>
<b>Table 7: Grid Connection Coordinates.....</b>	<b>11</b>
<b>Table 8: Substation Site Coordinates.....</b>	<b>11</b>
<b>Table 9: Technical Detail Summary .....</b>	<b>13</b>
<b>Table 10: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended in 2017), applicable to the proposed project .....</b>	<b>15</b>
<b>Table 11: Site Sensitivity Verification.....</b>	<b>19</b>
<b>Table 12: Results of sensitivity rating / constraints assessment .....</b>	<b>31</b>
<b>Table 13: Sensitivity rating / constraints assessment .....</b>	<b>39</b>
<b>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 .....</b>	<b>61</b>
<b>Table 15: Summary of comparative assessment of substation site alternatives for 132/11kV Substation .....</b>	<b>64</b>
<b>Table 16: Summary of comparative assessment of power line corridors.....</b>	<b>64</b>

<b>Table 17: Final Impact Assessment Table: Karee Grid .....</b>	<b>74</b>
<b>Table 18: Summary of impacts pre-mitigation and post-mitigation.....</b>	<b>75</b>
<b>Table 19: Summary of specialist findings and recommendations.....</b>	<b>85</b>

## 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	- Environmental 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 Plan
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

## KAREE 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 Karee 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') (**Figure 2**). The overall objective of the proposed development is to feed the electricity generated by the proposed Karee WEF into the national grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), other government run procurement programmes or potential private offtake entities.

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 Karee On-site Switching / Collector Substation and associated 132kV Power Line. 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. The proposed development requires an EA from the National Department Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning - WC DEADP) as well as CapeNature will also be consulted.

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). All relevant legislation and guidelines will be consulted during the BA process and will be complied with at all times.

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:

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



## 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 –	Section 5 Section 6
	(i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, the 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 –	Section 5 Section 6
	(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.	
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	Section 14.3



2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
	documents and inputs;	
	(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 14.3.4
	(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
	(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 14.2
	(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 14.2
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,	An environmental impact statement which contains-	Section 18

2014 EIA Regulations, as amended.	Requirements for Basic Assessment Reports	Location in this Basic Assessment Report
Section 3 (l)	(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.	
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
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 EMPs 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 Karee 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**

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

### 4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER 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**

<b>Business Name of EAP</b>	SiVEST SA (PTY) Ltd
<b>EAP</b>	Rendani Rasivhetshela
<b>Physical Address</b>	12 Autumn Road, Rivonia
<b>Postal Address</b>	PO Box 2921, Rivonia
<b>Postal Code</b>	2128
<b>Telephone</b>	011 798 0600
<b>Email</b>	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**

<b>Name of representative of the EAP</b>	<b>Educational Qualifications</b>	<b>Professional Affiliations</b>	<b>Experience (years)</b>
Michelle Nevette ( <i>Cert.Sci.Nat<sup>1</sup>.</i> )	MEnvMgt. (Environmental)	SACNASP <sup>2</sup> Registration No. 120356 EAPASA <sup>3</sup> Registration No. 2019/1560	21

<sup>1</sup> Certificated Natural Scientist

<sup>2</sup> South African Council for Natural and Scientific Professions

<sup>3</sup> Environmental Assessment Practitioners Association of South Africa

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
	Management)	IAIAsa <sup>4</sup>	
Natalie Pullen	MSc (Environmental Biotechnology)	EAPASA <sup>3</sup> Registration No. 2018/132 IAIAsa <sup>4</sup>	18
Rendani Rasivhetshela	BSc Honours Environmental Management	EAPASA <sup>3</sup> Registration No. 2019/1729 IAIAsa <sup>4</sup>	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:

**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	7

<sup>4</sup> International Association for Impact Assessment South Africa

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
			Professional Archaeologists (ASAPA)	
	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
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 12km north (respectively) 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 Karee WEF on-site substation to the national grid via Kappa Substation. (Refer **Figure 2** below).

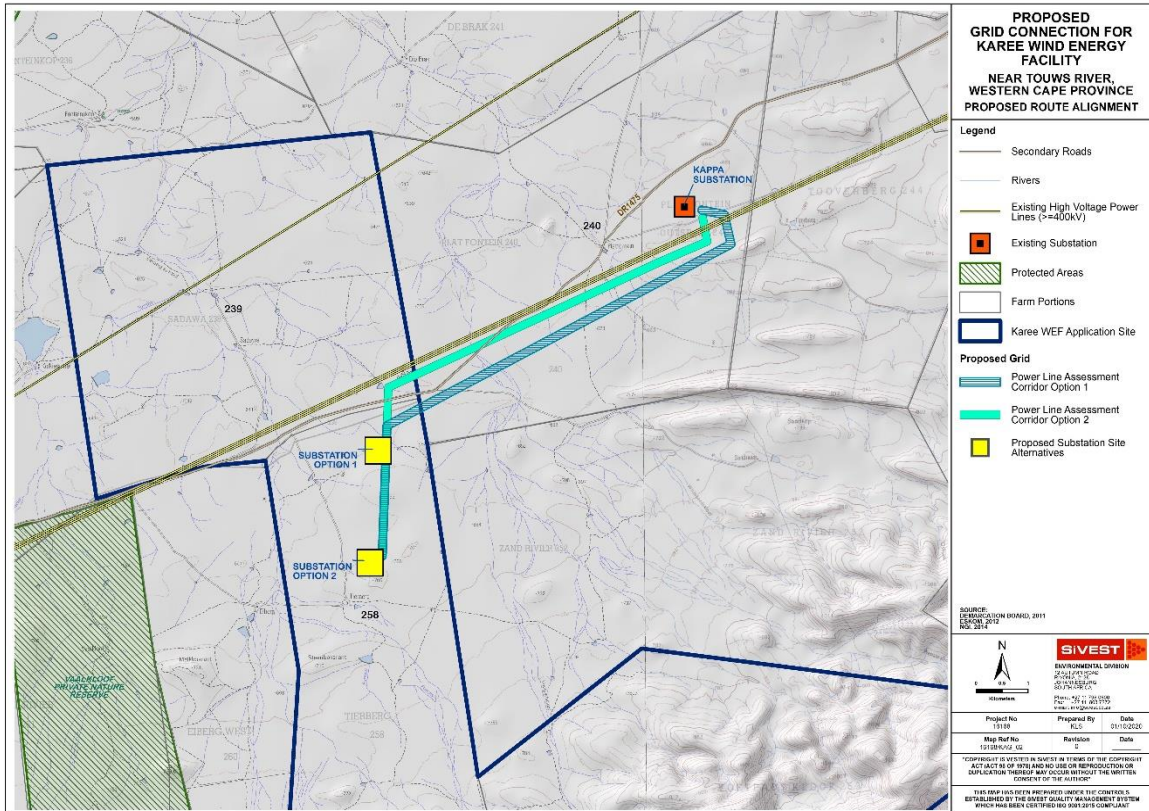


Figure 2: Site locality

5.1 21 Digit Surveyor General Codes of the site

Table 6: 21 Digit Surveyor General Code

21 Digit Code	Description
C0190000000023900000	FARM SADAWA NO 239
C0190000000023900000	FARM PLATFONTEIN NO 240
C0190000000025800000	FARM TIERBERG NO 258

## 5.2 Coordinates of the site

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

**Table 7: Grid Connection Coordinates**

<b>KAREE GRID CONNECTION</b>				
<b>CENTRE LINE COORDINATES (DD MM SS.sss)</b>				
	<b>START POINT</b>	<b>MIDDLE POINT</b>	<b>END POINT</b>	<b>APPROX LENGTH (KM)</b>
OPTION 1 (from Substation 1)	S33° 9'2.63"	S33° 7'41.27"	S33° 6'32.63"	9.1 km
	E19°56'48.82"	E19°59'10.05"	E20° 0'42.09"	
OPTION 1 (from Substation 2)	S33°10'4.94"	S33° 7'58.13"	S33° 6'32.86"	11.02 km
	E19°56'45.48"	E19°58'36.28"	E20° 0'42.07"	
OPTION 2 (from Substation 1)	S33° 9'2.63"	S33° 7'36.80"	S33° 6'35.41"	8.56 km
	E19°56'48.82"	E19°58'45.36"	E20° 0'44.60"	
OPTION 2 (from Substation 2)	S33°10'4.94"	S33° 7'41.93"	S33° 6'35.41"	10.48 km
	E19°56'45.48"	E19°58'33.53"	E20° 0'44.60"	

The centre point coordinates for the two (2) onsite substation location alternatives are listed in **Table 8** below. The onsite substation will consist 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<sup>2</sup>) i.e. 12.5 ha for the IPP Portion and 12.5 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**

<b>KAREE SUBSTATION (ALTERNATIVES), BESS, CONSTRUCTION LAYDOWN/O&amp;M BUILDINGS</b>			
<b>FOUR SIDE COORDINATES</b>		<b>LATITUDE (S)</b>	<b>LONGITUDE (E)</b>
<b>Site Coordinates - OPTION 1 (Preferred)</b>	<b>Centre points</b>	33° 8'57.29"S	19°56'42.93"E
	<b>Corner 1</b>	33° 8'49.91"S	19°56'33.78"E
	<b>Corner 2</b>	33° 8'50.01"S	19°56'53.05"E
	<b>Corner 3</b>	33° 9'6.24"S	19°56'52.85"E
	<b>Corner 4</b>	33° 9'6.08"S	19°56'33.56"E
OPTION 2	Centre points	33°10'6.98"S	19°56'35.28"E

	Corner 1	33° 9'58.12"S	19°56'27.06"E
	Corner 2	33° 9'58.28"S	19°56'46.36"E
	Corner 3	33°10'14.48"S	19°56'46.16"E
	Corner 4	33°10'14.31"S	19°56'26.88"E

*Highlighted option represents the preferred alternative.*

## 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

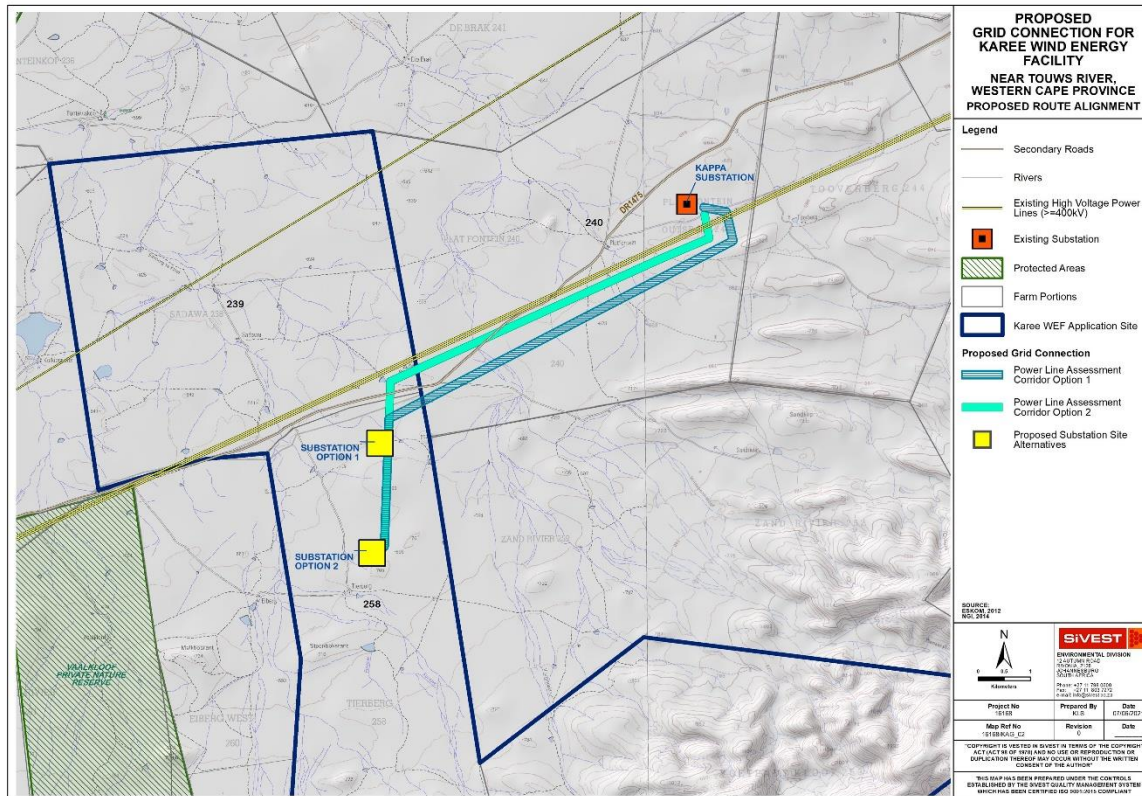
#### 7.1.1 Grid and Associated Infrastructure

The proposed grid connection infrastructure to serve the Karee 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 Kappa 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 3** and attached in **Appendix 3**.





**Figure 3: Preliminary route alignment layout**

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

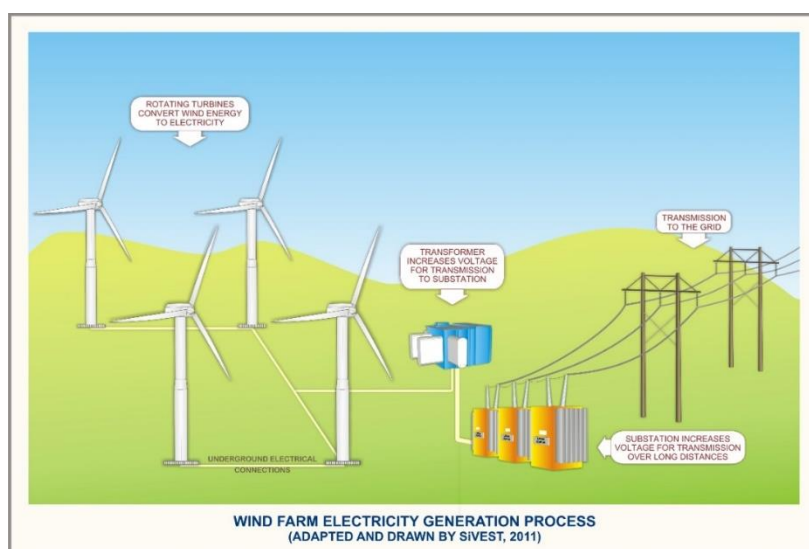
A summary of the project technical details is provided in **Table 9** below.

**Table 9: Technical Detail Summary**

aComponent	Description / Dimensions
Generation Capacity of Substation	33/132kV
Location	The proposed development is located approximately 12km and 20km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality.
Affected Properties	<ul style="list-style-type: none"> <li>Farm Tierberg No 258; and</li> <li>Farm Voetpads Kloof No 253.</li> </ul>
SG Codes	<ul style="list-style-type: none"> <li>C0190000000023900000</li> <li>C0190000000025300000</li> <li>C0190000000025800000</li> </ul>
Area occupied by Substation	Up to approximately 12.5 hectares
Height of Substation	Height of substation will be confirmed during the final design stages of the substation, prior to construction commencing
Transformer Information	<ul style="list-style-type: none"> <li>Will be a shared substation which will contain transformers for voltage step-up from medium voltage to high voltage.</li> </ul>

aComponent	Description / Dimensions
	<ul style="list-style-type: none"> <li>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</li> </ul>
Site Access	The proposed application site will be accessed via the DR1475 District Road and DR1475, MR316 and MR319 Western Cape Government (WCG) provincial Roads.
Grid Connection Information	<ul style="list-style-type: none"> <li>One (1) new 11-33/132kV on-site substation, situated on a site occupying an area of up to approximately 2ha. This will be included within the 12.5 ha of the Eskom portion site. 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</li> <li>One (1) new 132kV overhead power line connecting the on-site substation to Kappa Substation and thereby feeding the electricity into the national grid.</li> <li>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.</li> </ul>

Electricity generated by the proposed Karee WEF will be fed into the national grid by way of a 132kV overhead power line, connecting the Karee WEF on-site substation to the national grid via Kappa Substation **Figure 4** below provides a conceptual diagram of the electricity generation process.



**Figure 4: Conceptual WEF electricity generation process showing electrical connections**

## 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 <b>Basic Assessment Activity(ies)</b> as set out in <b>Listing Notice 1</b> of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
11 (i)	<p><b>GN R. 327 (as amended) Item 11:</b> The development of facilities or infrastructure for the transmission and distribution of electricity—</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>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<sup>2</sup>) i.e. 12.5 ha for the IPP Portion and 12.5 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.</p>
12 (ii) (a) (c)	<p><b>GN R. 327 (as amended) Item 12:</b> The development of:</p> <p>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<p>The proposed development will entail the construction of grid infrastructure (including the IPP portion/ yard of the 33kV/132kV shared on-site substation and BESS) within the proposed project site which will have a physical footprint of approximately 100m<sup>2</sup> or more and may occur within some of the surface water features / watercourses identified within the application site or within 32m of some of the surface water features / watercourses identified within the application site.</p> <p>The infrastructure associated with the proposed development will avoid the surface water features / watercourses identified within the application site where possible, although some structures (such as internal site roads)</p>

		will occur within some of the surface water features / watercourses identified within the application site and/or within 32m of some of the surface water features / watercourses identified within the application site.
19	<b>GN R. 327 (as amended) Item 19:</b> 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;	<p>The proposed development involves the construction of a grid infrastructure (including the IPP portion/ yard of the 33kV/132kV shared on-site substation and BESS) within the proposed project site.</p> <p>Although the buildable area has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal site roads to be constructed (as required) will need to traverse some of the identified surface water features / watercourses. In addition, during construction of these roads (as required), soil will need to be removed from some of the identified surface water features / watercourses.</p>
24 (ii)	<b>GN R. 327 (as amended) Item 24:</b> 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.	<p>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.</p> <p>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.</p>
27 (i)	<b>GN R. 327 (as amended) Item 27:</b> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous	The proposed development involves the construction of the 132kv portion of the shared 33kv/132kv onsite

	vegetation.	substation which will occupy an area of approximately 12.5ha. 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 will be required and will be included as part of the 12.5 ha.
28 (ii)	<b>GN R. 327 (as amended) Item 28:</b> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:  (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The proposed development site is currently zoned for agricultural land use, and the area to be developed will be larger than 1ha.
56 (ii)	<b>GN R. 327 Item 56:</b> 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 <b>Scoping and EIA Activity(ies)</b> as set out in <b>Listing Notice 2</b> 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 <b>Basic Assessment Activity(ies)</b> as set out in <b>Listing Notice 3</b> 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)	<b>GN R. 324 (as amended) Item 4:</b> The development of a road wider than 4 metres with a reserve less than 13,5 metres.  <b>i. Western Cape</b> 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.	<p><b>GN R. 324 (as amended) Item 12:</b> The clearance of an area of 300 square metres or more of indigenous vegetation</p> <p><b>i. Western Cape</b> ii. Within critical biodiversity areas identified in bioregional plans;</p>	The proposed development will transform more than 300m <sup>2</sup> 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 Karee WEF application site (part of a separate application).
14 (ii) (a) (c); i. i. (ff)	<p><b>GN R. 324 (as amended) Item 14:</b> The development of –</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs –</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p><b>i. Western Cape</b> 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;</p>	<p>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<sup>2</sup> or more. The proposed substation will occupy an area of up to approximately 2ha.</p> <p>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.</p> <p>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 Karee WEF application site (part of separate application).</p>
18 i. ii. (aa)	<p><b>GN R. 324 (as amended) Item 18:</b> The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p><b>i. Western Cape</b> ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation</p>	Internal roads are required within the buildable area 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

		<p>roads will be constructed where necessary.</p> <p>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.</p>
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## 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	<p>The Agricultural Compliance Statement is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The site is classified by the national web-based environmental screening tool as mostly medium and low sensitivity for impacts on agricultural resources.</p> <p>The sensitivity attributed to the site by the screening tool is confirmed by this assessment. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 250 mm per annum and high evaporation of approximately 1,450 mm per annum) proves the area to be arid, and therefore of limited land capability. In addition, the land type data shows the dominant soils to be shallow, sandy soils on underlying rock or hard-pan carbonate. A predominantly low agricultural sensitivity is entirely appropriate for this land which is unsuitable for crop production.</p> <p>This site sensitivity verification verifies the site as being of low to medium agricultural sensitivity. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement.</p>
Animal Species Theme	High	<p>The Terrestrial Ecological Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>According to the DFFE the Project Area of impact (PAOI) and immediate</p>

Theme	Sensitivity	Comment
		<p>environment is classified as Medium and High sensitivity for animal. The PAOI contains confirmed habitat for species of conservation concern (SCC)</p> <p>The High classification is linked to Ludwig's Bustard (Globally and Regionally Endangered), Lanner Falcon <i>Falco biarmicus</i> (Regionally Vulnerable), and Southern Black Korhaan (Globally and Regionally Vulnerable). The Medium sensitivity is linked to Ludwig's Bustard and Southern Black Korhaan.</p> <p>The occurrence of SCC was confirmed during the surveys i.e. Ludwig's Bustard (Globally and Regionally Endangered) and Martial Eagle (Globally and Regionally Endangered) was recorded in the study area. Based on these criteria, the study area classification of <b>High</b> sensitivity is confirmed.</p>
Aquatic Biodiversity Theme	Very High	<p>The Aquatic Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>The DFFE Screening Tool identified two sensitivity ratings within the development study area, very high and few areas of low. Although based on the DFFE screening tool results, the study area does not contain any Very High Sensitivity Ratings, the fine scale mapping conducted in the is assessment indicates that such areas do occur within the site.</p>
Archaeological and Cultural Heritage Theme	High	<p>The Heritage Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>According to the Archaeological Report, the DFFE screening tool indicates a low to high sensitivity rating for the study. The field work in the study area demonstrates that historical structures, archaeological sites and grave and burial grounds of heritage significance warrant conservation. Therefore, the DFFE screening tool sensitivity map is not entirely supported based on the findings of this fieldwork. The general low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in this specific region.</p>
Civil Aviation Theme	Medium	<p>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.</p>
Defence (Wind) Theme	Low	<p>A sensitive defence site is located in close proximity to the site. Please note that the applicant is submitting an application to SANDF for approval (this will be attached as part of the final BA report).</p>
Palaeontology Theme	Medium	<p>The Palaeontology Report is included in <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>According to the Palaeontological Report, the DFFE screening tool indicates a medium sensitivity rating for the study.</p> <p>The overall palaeontological sensitivity of the Karee grid project area is inferred to be generally LOW due to (1) poor sedimentary bedrock exposure, (2) local tectonic cleavage development and (3) deep chemical weathering of mudrock facies. No high sensitivity fossil sites or palaeontological heritage significance or No-Go areas were identified here during the present field survey.</p> <p>The palaeosensitivity mapping shown by the DFFE Screening Tool is therefore contested.</p>



Theme	Sensitivity	Comment
Plant Species Theme	Medium	<p>The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>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 <b>Very High sensitivity</b> areas was found to be greater than the extent in the Screening Tool.</p>
Terrestrial Biodiversity Theme	Very High	<p>The Terrestrial Ecological Report is included <b>Appendix 6</b> of the Draft Basic Assessment Report.</p> <p>Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of CBAs, Ecological Support Areas, NFEPA's and rivers. The presence of these Very High Sensitivity features was confirmed during this assessment.</p> <p>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.</p> <p>However, and 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.</p>

## 9. DESCRIPTION OF THE RECEIVING ENVIRONMENT

### 9.1 Geographical

The proposed Karee grid infrastructure is located approximately 18km north (respectively) of Touws River in the Western Cape Province and is within the Witzenberg Local Municipality, in the Cape Winelands District Municipality (**Figure 5**).





**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 the 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 climate of area is characterized as semi-arid with hot, drier, summers and cold, wetter, winters. Precipitation is controlled by cold fronts and orographic rainfall, with rainfall 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.

### 9.4 Topography

The site proposed for the Karee 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 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 (Figure 7)*

and Roggeveld ranges characterised by incised valleys and the flatter, higher lying plateaus with steep slopes.

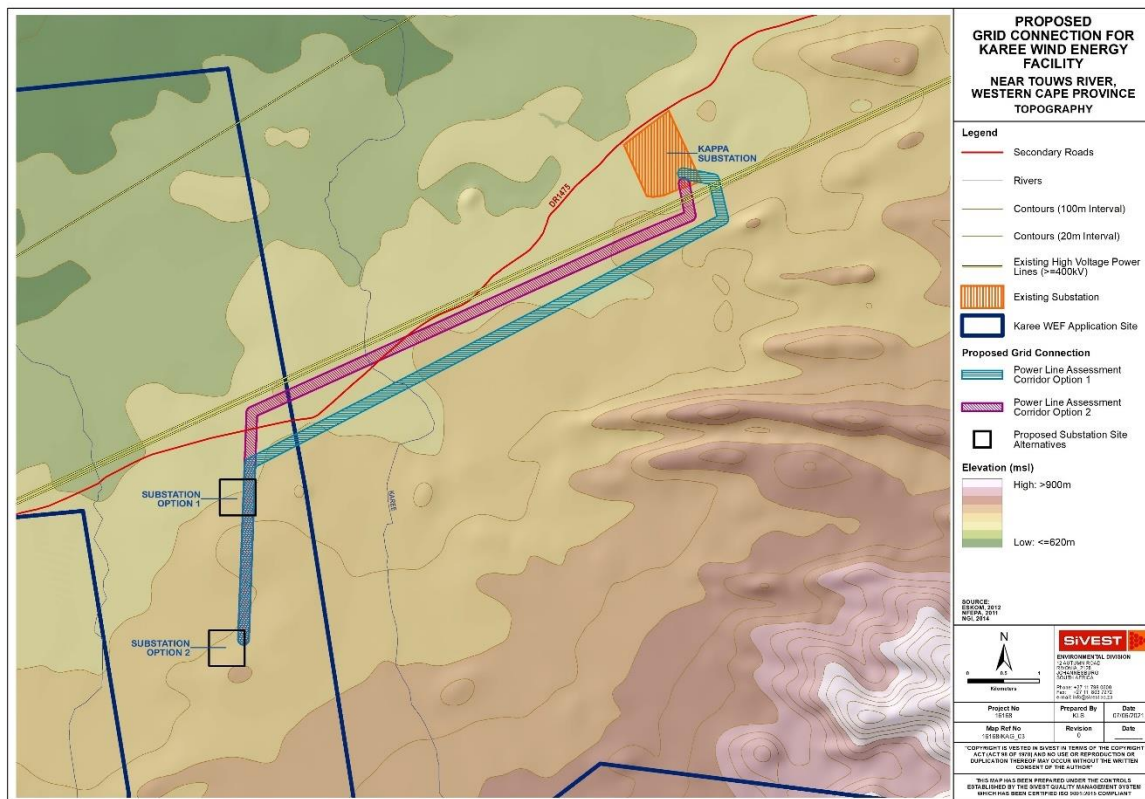


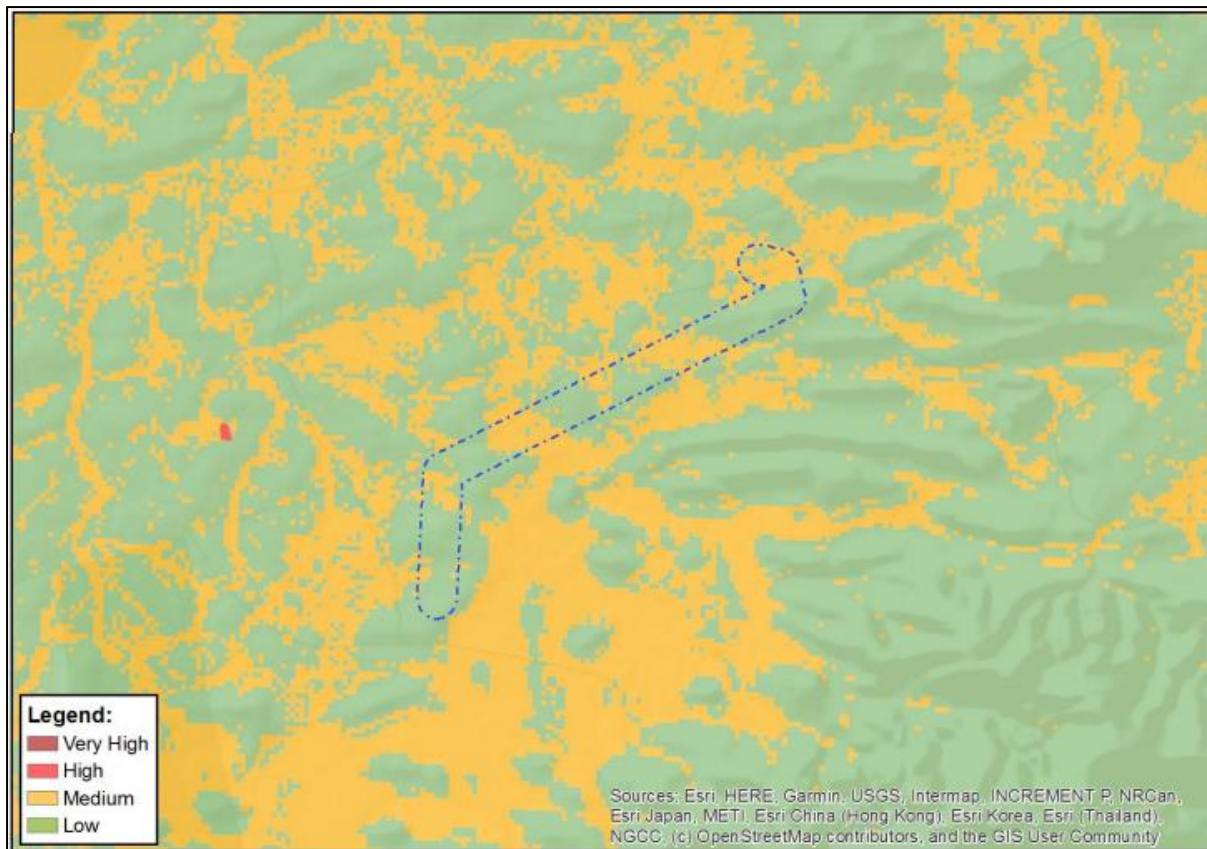
Figure 7: Topography

## 9.5 Agricultural

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (October 2021). According to the report, “Grazing of both sheep and game is the dominant agricultural land use in the area. The 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”.

The site is classified by the national web-based environmental screening tool as mostly medium and low sensitivity for impacts on agricultural resources.

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

The small-scale differences in land capability across the project area are not very significant and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground.

The agricultural footprint of the development, which is the total footprint of the facility that actually excludes agricultural land use, is predominantly on land of low agricultural sensitivity. Only a small proportion is on land of medium agricultural sensitivity and the footprint does not fall on any land higher than medium.

The allowable development limit for land of low and medium sensitivity for impacts on agricultural resources is 2.5 ha per MW and is designed to allow solar PV developments on such land. Solar PV developments have agricultural footprints that are typically eight times the size of wind farm ones, and wind farm footprints therefore fit very easily into the development limits on low and medium sensitivity land. It is hereby confirmed that the final layout, and associated agricultural footprint, will be well within the allowable limit.

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.

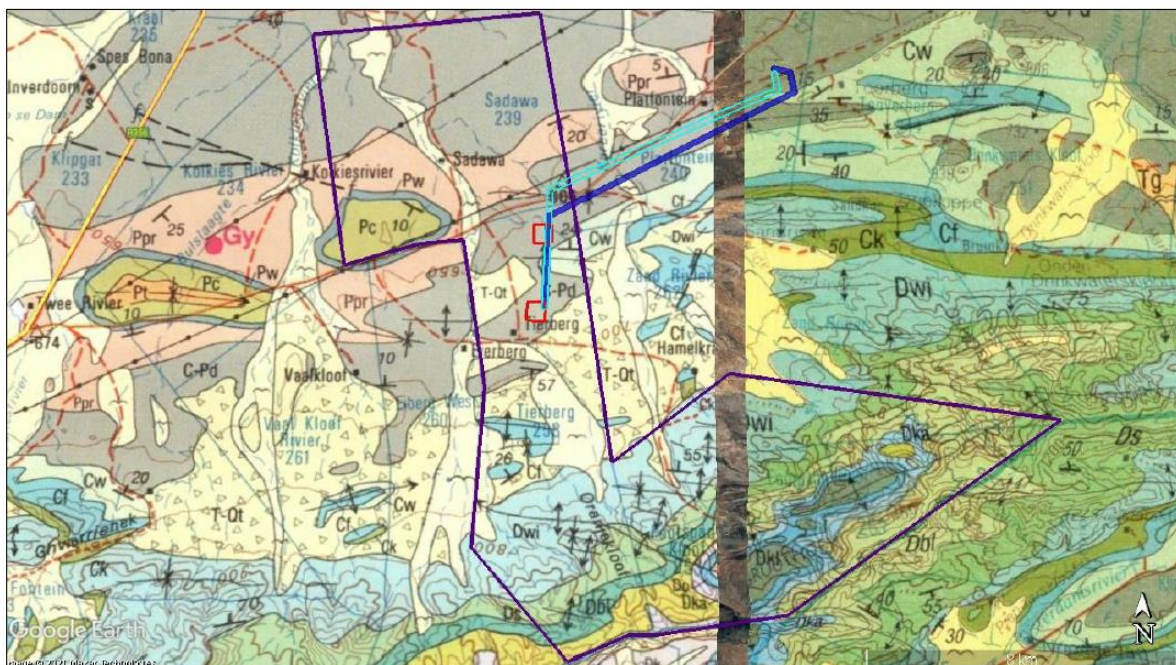
From an agricultural impact point of view, it is recommended that the development be approved.

## 9.6 Geology and Soils

A desktop geotechnical report was undertaken by Gage Consulting (Pty) Ltd (October 2020).

*The assessment area is underlain by rock units of Dwyka Group and 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 transported material (alluvium and scree), and steep slopes. These constraints may be mitigated via standard engineering design and construction measures.*

*The proposed developments are assessed to have a “Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation” provided that the recommended mitigation measures are implemented. 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.*



**Figure 9: Geology (Extract of 1:250000 scale Geological Map 3320 Ladysmith and 3319 Worcester- Gage Consulting)**

## 9.7 Geohydrology

A desktop geotechnical report was undertaken by Gage Consulting (Pty) Ltd (October 2020). Accordingly: “The site is located in the Olifants/Doom 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”.*

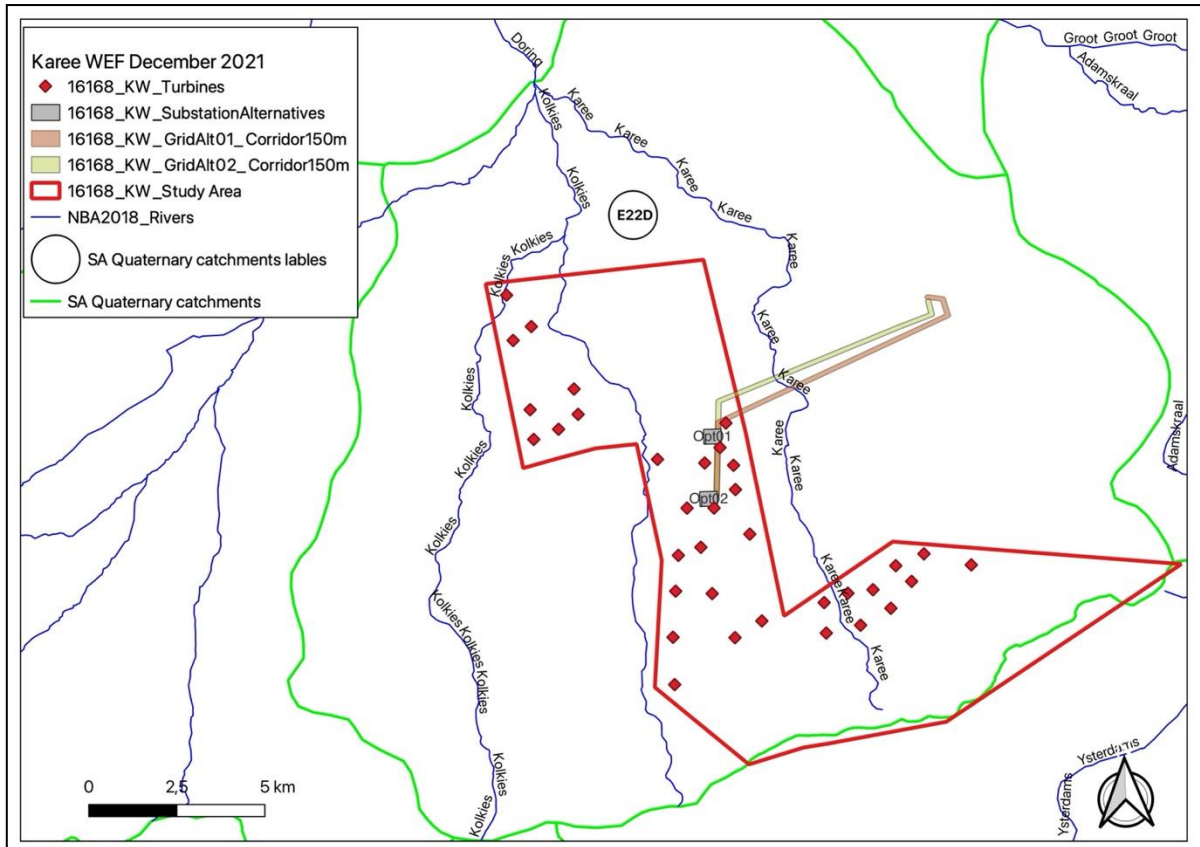
## 9.8 Surface Water

An Aquatic Impact Assessment was undertaken by EnviroSci (Pty) Ltd (November 2021).

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

- *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 Karee, Kolkies and a tributary of the Kolkies River (Plate 1), contained some 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 , 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.*

The features listed above, drain the study area in a northly region, forming part of the E22D Quinary Catchment, as these systems form part of the headwaters of the Doring River, which flows beyond the site (refer **Figure 10** showing preliminary layout). 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.



**Figure 10: 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 calcyntia*, *Merxmuellera disticha*, and *Cynodon dactylon*.





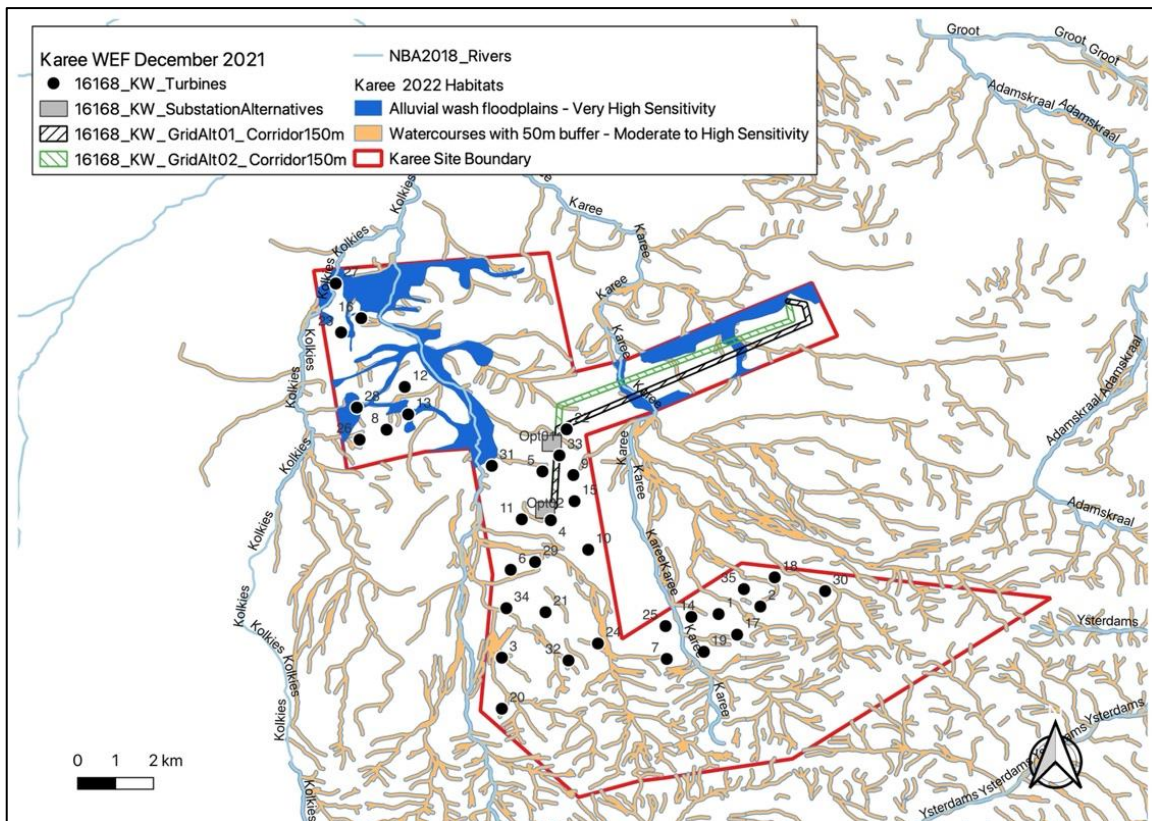
**Figure 11: A broad watercourse with defined riparian zone associated with a tributary of the Kolkies River, that bisects the study area**



**Figure 12: Sandy / pebble alluvial channel associated with the upper reaches of the Kolkies River that will be traversed by internal access roads**

Two 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.



**Figure 13: Delineated aquatic zones and respective sensitivities**

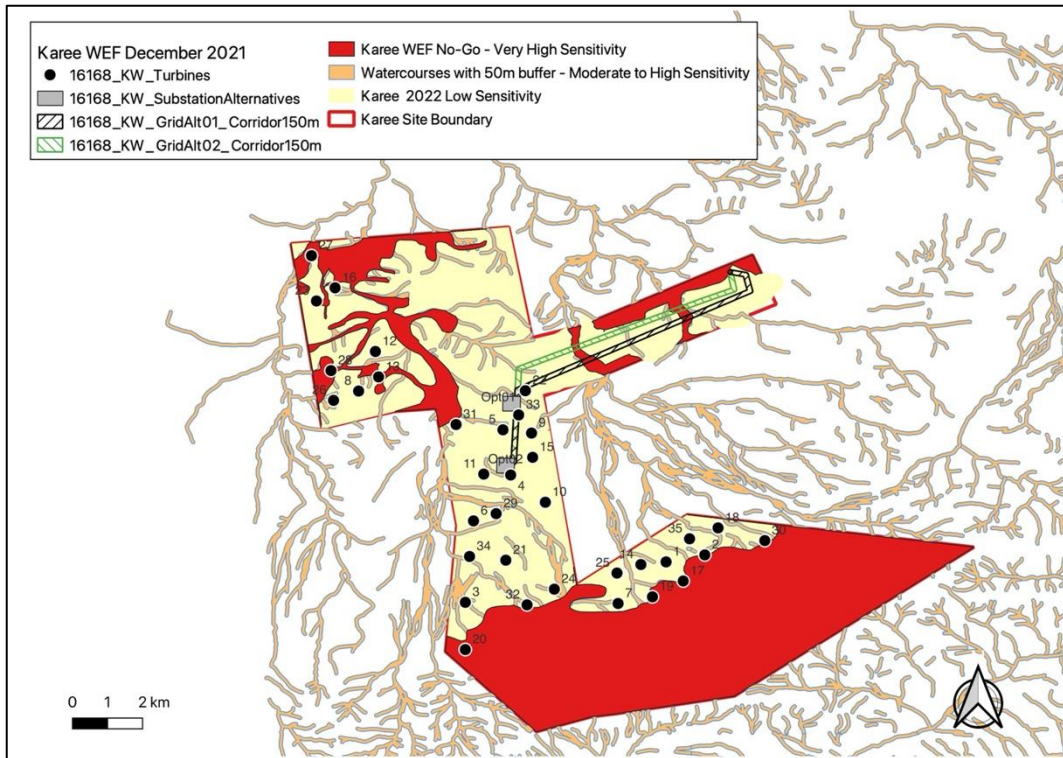
In terms of the Present Ecological State, the catchment areas and subsequent rivers / watercourse are largely natural in state with localised impacts to some areas which includes erosion and sedimentation due to existing road crossings as well as impeded water flow due to several channel farm dams.

The present layout except for several new watercourse crossings, within or near existing roads/tracks, the overall layout could avoid the Very High sensitivity areas shown in the figure above.

The following sensitivity constraints have been identified:

**Table 12: Results of 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
<b>Hardstands, Buildings / Substations &amp; BESS</b>	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	
<b>Roads</b>	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	
<b>Overhead Lines</b>	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 (with no-go identified in red)**

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 on aquatic resources, but requiring the clearing of areas with terrestrial vegetation, especially when considering the associated roads, cables and other infrastructure.

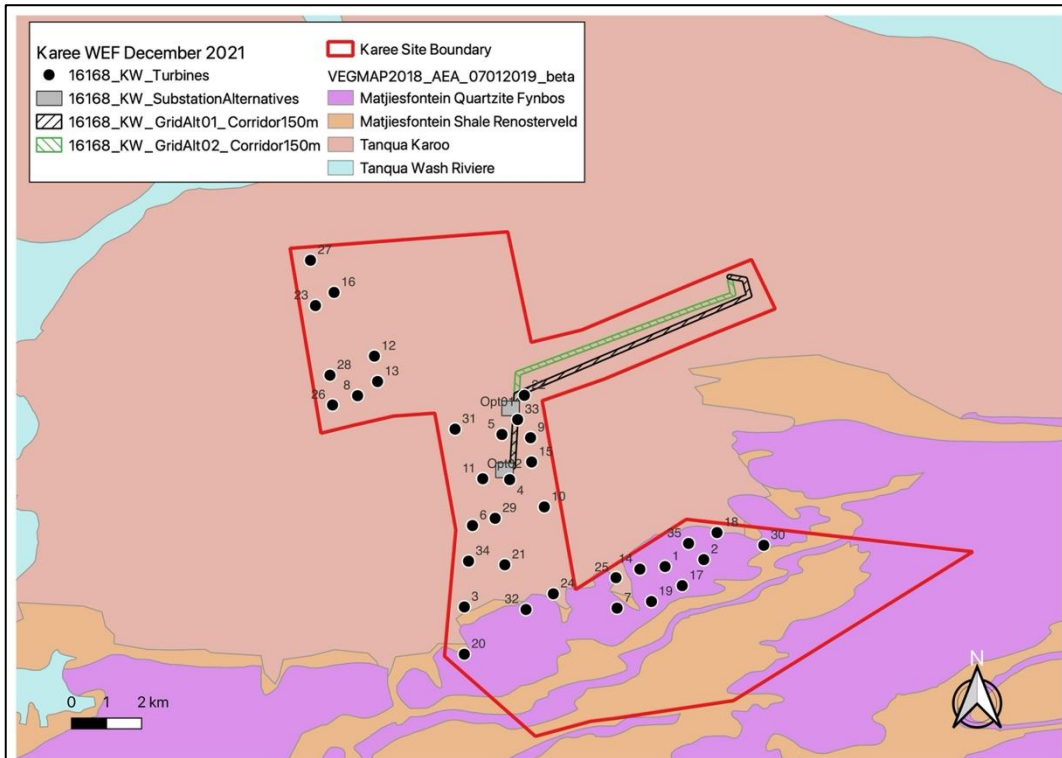
A variety of environmental features were observed within the study area, and these were mapped and buffered as necessary for their protection. The current layout has the potential, to a large degree, to avoid these sensitive features and buffer areas, greatly reducing the potential overall impact and environmental risk.

## 9.9 Biodiversity

According to the Terrestrial Biodiversity Assessment, the site is dominated by three vegetation types, spanning Karoo, Fynbos and Renosterveld habitat types. *According to Mucina and Rutherford (2007 – amended 2018), the following vegetation units have been described for the site (Figure 15):*

- *Tanqua Karoo SKv5*

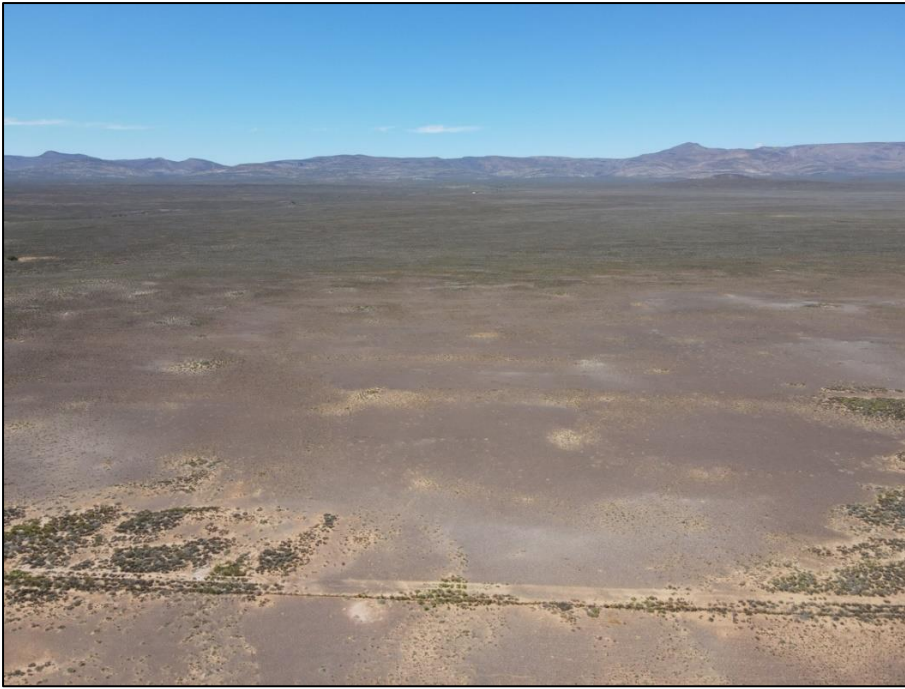
The site is located within the Tanqua Karoo. The Tanqua Karoo is not listed as a Threatened Ecosystem as per the National Environmental Management Biodiversity Act,



**Figure 15: National Vegetation Map as per Mucina and Rutherford (2007) amended National Spatial Biodiversity Assessment (NSBA) 2018**

### 9.9.1 Vegetation and flora

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 Matjiesfontein vegetation units in the south (**Figure 17**).



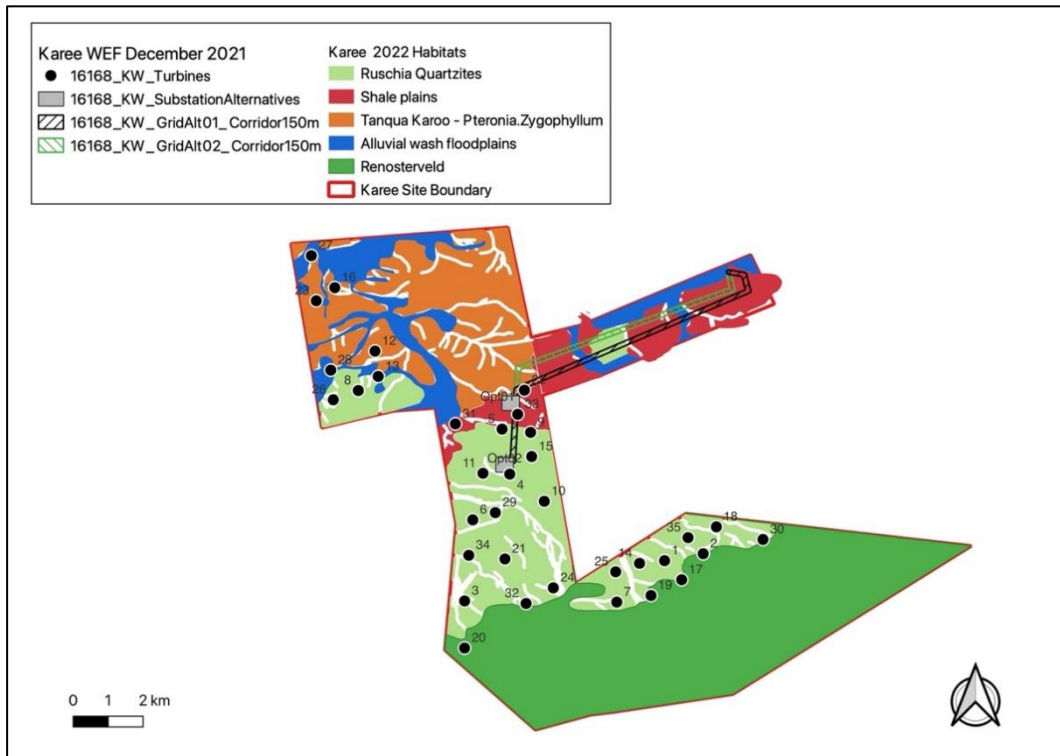
**Figure 16: Aerial view of central portion of the site looking south**



**Figure 17: Habitat transition within the site, dominated by sparsely vegetated shale / quartzite plains**

**Figure 18** therefore represents the finer scale mapping of the habitats/vegetation units found on site and could be summarised as follows:

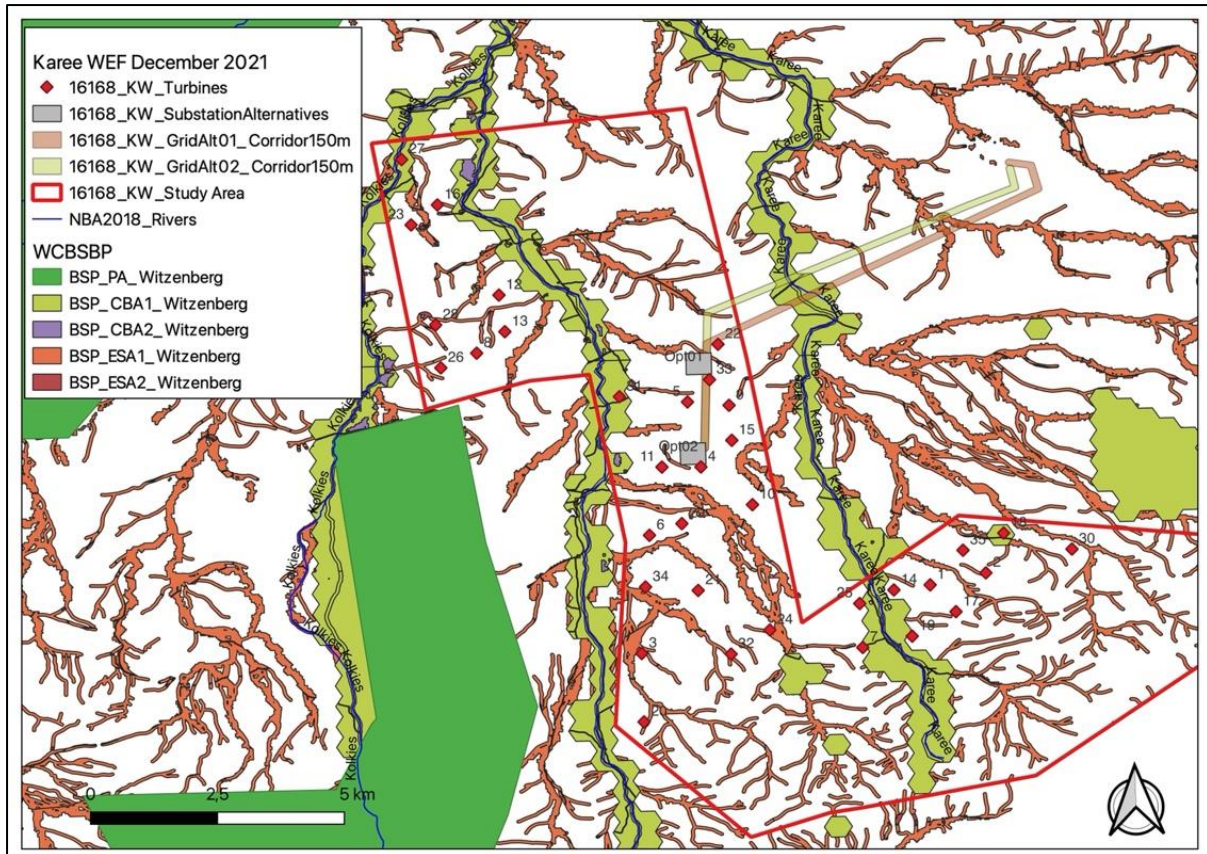
- *Ruschia quartzites*
- *Shale plains*
- *Tanqua karoo - Pteronia pallens / Zygophyllum shrubland*
- *Renosterveld & Fynbos*
- *Alluvial Wash floodplains*



**Figure 18: Vegetation units at a finer scale**

No rare or listed plant species were observed during the survey period within; however several species are protected in terms of the Western Cape legislation. The disturbance, destruction and/or relocation, whichever is more relevant, of these species would require the relevant permits from the provincial authority. It is highly recommended that a detailed walkdown of the final layout is conducted, during a suitable time of the year. This will result in a complete species list for the actual footprints and / or assist with any micro-siting that may be required to avoid any important habitat, as the relocation of certain species during a search and rescue operation is not always successful, thus avoidance is found to be a better solution.

In terms of the provincial Biodiversity Spatial Plan Critical Biodiversity Area (CBA) spatial layers (Figure 19), 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. Refer to **Figure 19** below.



**Figure 19: Critical Biodiversity Areas**

### 9.9.2 Fauna

Approximately 179 animal species have been previously observed within the two 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/Miersshoottier
- *Felis silvestris* - African wild cat/Afrika wildekat
- ***Ictonyx striatus* - Striped polecat/Stinkmuishond**
- *Mellivora capensis* - Honey badger/Ratel
- ***Otocyon megalotis* - Bat-eared fox/Bakoovos**
- *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*)];
- 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 20: One of the many Angulate tortoises (*Chersina angulata*) observed on site that had succumbed to the previous drought conditions**

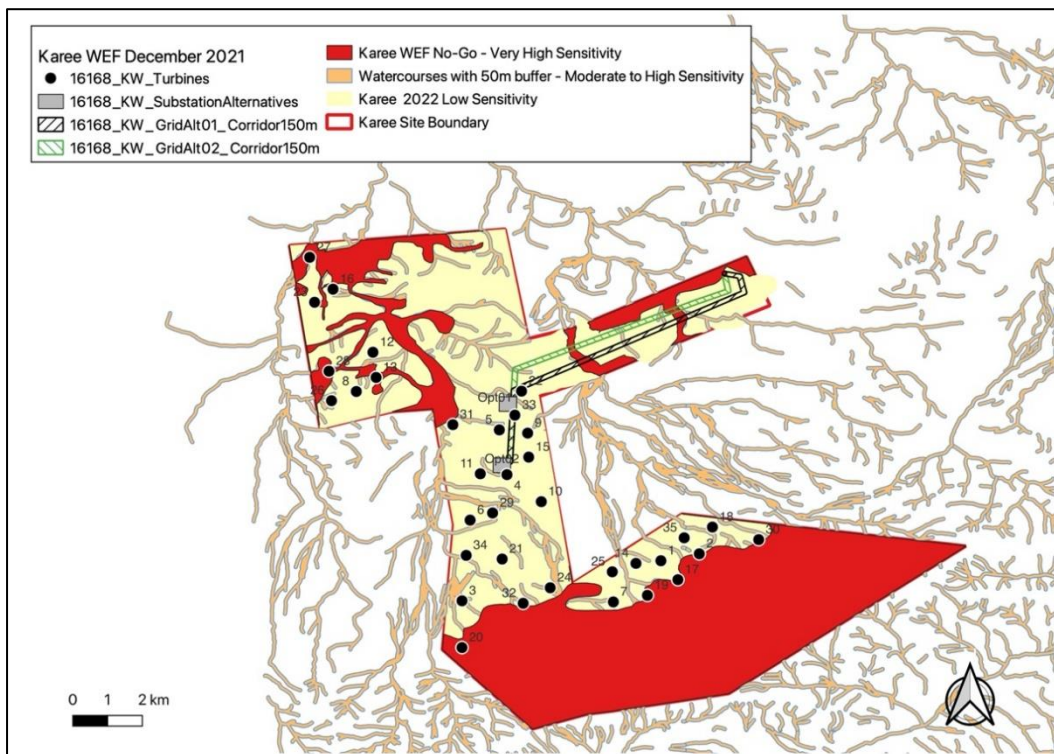


**Figure 21: Another common siting within the region, namely the Puffadder (*Bitis arietans arietans*), with two (2) sited during the assessment on site**

The following sensitivity constraints have been identified:

**Table 13: 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
Hardstands, Buildings / Substations & BESS	Renosterveld / Fynbos	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
	Shale plains, Tanqua Karoo and Ruschia Quartzites	Low – thus acceptable	
Overhead Lines	Renosterveld / Fynbos Shale plains, Tanqua Karoo and Ruschia Quartzites	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	



**Figure 22: Habitat sensitivity map inclusive of terrestrial and aquatic habitats**

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.

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.

Based on the findings of this study, the specialist finds no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented.

## 9.10 Avifauna

An Avifaunal Assessment was undertaken by Chris van Rooyen Consulting (July 2022). According to the assessment, it is estimated that a total of 135 bird species could potentially occur in the broader area. Of these, 18 species are classified as priority species for wind development and 38 are classified as sensitive species for powerlines. The Cedarberg - Koue Bokkeveld Complex Important Bird Area (IBA) SA101 is the closest IBA and is located approximately 26km 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.

### 9.10.1 Findings and Assessment

Negative impacts on avifauna by electricity infrastructure generally take two main forms namely electrocution and collisions. Displacement due to habitat destruction and disturbance associated with the construction of the electricity infrastructure is another impact that could potentially impact on avifauna.

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. The electrocution risk is largely determined by the pole/tower design. In the case of the proposed power lines, no electrocution risk is envisaged because the proposed design of the 132kV line, namely the steel monopole and self-supporting lattice structures, should not pose an electrocution threat to any of the priority species which are likely to occur in the study area.

Collisions are the biggest threat posed by transmission lines to birds in southern Africa. Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines. The line could potentially pose a collision risk to various species, particularly large terrestrial species including Red Data species such as Ludwig's Bustard, Karoo Korhaan and Southern Black Korhaan and various waterbirds when the dams are full, and the drainage lines contain water. The occurrence of SCC was confirmed during the integrated pre-construction monitoring programme, with observations of Ludwig's Bustard, Southern Black Korhaan, Karoo Korhaan and Verreaux's Eagle recorded within the PAOI and its immediate surrounds. The appropriate mitigation measure would be to mark the entire line with Bird Flight Diverters.

During the construction of power lines, service roads (jeep tracks) and substations, habitat destruction/transformation inevitably takes place. The construction activities will constitute the following:

- Site clearance and preparation;
- Construction of the infrastructure (i.e. the on-site substation, OHL and service road);
- Transportation of personnel, construction material and equipment to the site, and personnel away from the site;
- Removal of vegetation for the proposed substation and stockpiling of topsoil and cleared vegetation;
- Excavations for infrastructure;

These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed onsite substations through transformation of habitat, which could result in temporary or permanent displacement. Unfortunately, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the substation yard is unavoidable. Fortunately, due to the nature of the vegetation, and judged by the existing power lines, very little if any vegetation clearing will be required in the power line servitudes. The habitat in the study area is extensive, very uniform and largely untransformed from a bird impact perspective; therefore, the loss of a few hectares of habitat for priority species due to direct habitat transformation associated with the construction of the proposed substation is likely to have a low impact on them. While all birds will be affected by the loss of habitat, the species most likely to be more heavily impacted would be small, common, non-Red Data species which happen to be resident in those few hectares of natural scrub habitat.

Apart from direct habitat destruction, the above-mentioned activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although in practice that can admittedly be very challenging to implement. There are currently no large raptor nests on the section of the Bacchus-Droërivier 1 400kV transmission line that will run next to the proposed 132kV grid connection, therefore no disturbance of large breeding raptors are expected. There might be some level of disturbance for other species breeding on the existing powerline i.e. Pied Crow, Rock Kestrel and Greater Kestrel. Large terrestrial species might also be affected by displacement due to disturbance.

### 9.10.2 Summary and Conclusion

The proposed Karee grid connection will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The alternative substation locations are all situated in essentially the same habitat, i.e. Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. The two corridor options are essentially similar in length and run through the same habitat, therefore there are no preferred option, both are acceptable. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

## 10. DESCRIPTION OF THE SOCIO-ECONOMIC ENVIRONMENT

### 10.1 Socio economic characteristics

#### 10.1.1 Cape Winelands District Municipality

The Cape Winelands District is a land locked municipality and covers an area of 21 472.67 km<sup>2</sup> (approximately 16.6 % of the total Western Cape Province). It borders the following Districts as depicted in **Figure 23**:



**Figure 23: Location of the Cape Winelands District in relation to other District Municipalities (Cape Winelands Integrated Development Plan (IDP), Draft 5<sup>th</sup> 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               | • Bonnievale  | • Ceres     | • De Doorns |
| • Franschhoek          | • Gouda       | • Klapmuts  | • McGregor  |
| • Montagu              | • Op-Die-Berg | • Paarl     | • Pniel     |
| • Prince Alfred Hamlet | • Rawsonville | • Robertson | • Saron     |

- Stellenbosch
- Stellenbosch Farms
- Touws River
- Tulbagh
- Wellington
- Wolseley
- Worcester

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<sup>2</sup>. 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<sup>2</sup>. 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%)

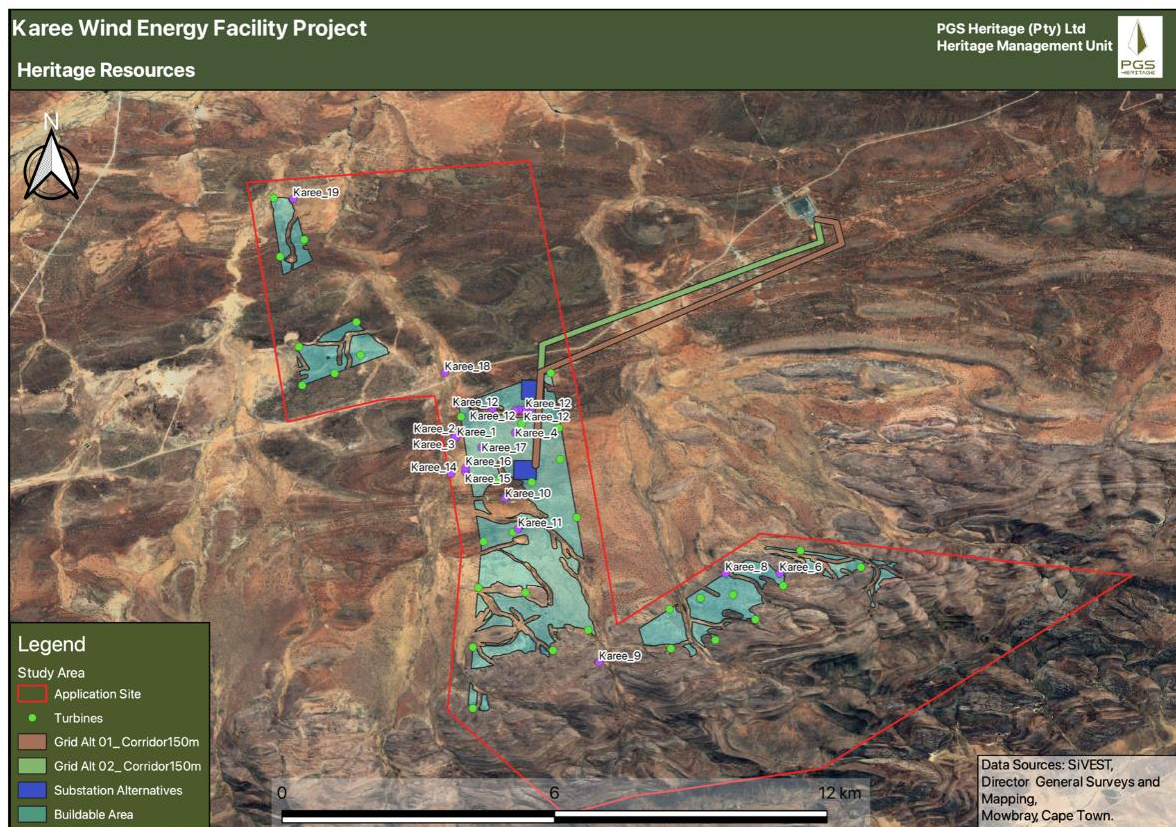
- Transport, storage and communication (8%)
- Community, social and personal services (3.5%).

With a population of 115 946 people the Witzenberg Local Municipality has a population density of 1 078/km<sup>2</sup>. 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 (April 2022). *The fieldwork conducted for the evaluation of the possible impact of the new Karee WEF and associated grid connection infrastructure has revealed that there are no heritage resources identified within the grid corridors. Refer to Figure 24 below.*



**Figure 24: Locality of the heritage resources identified within the study area.**

### Recommendations

the impact of the new Karee 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 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 30-meter buffer around all archaeological site with a rating of IIIB and higher.
- Demarcate the resources rated as IIIC-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.

In the event that heritage resources are discovered during site clearance, construction activities must stop in the vicinity, and a qualified archaeologist must be appointed to evaluate and make recommendations on mitigation measures. There are no objections to the proposed project.

### **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 Ceres Karoo landscape is a semi-arid region, with rainfall mainly in the form of summer thunderstorms in recent years, some snow and precipitation in winter. The vegetation is characteristic of the Succulent Karoo biome, low succulent shrub dotted by scattered tall shrubs, patches of 'white' grass visible on the plains, the most conspicuous dominants being dwarf shrubs (Mucina & Rutherford, 2006). The area is characterised by a series of very high and long ridges with valleys in-between.*

*The area is sparsely populated with a few farmsteads and their associated structures located on the valley floors, usually adjacent to water courses and linked by a series of crisscrossing farm tracks and historic roads that are material remains of the important connections and linkages between the people travelling across the vast landscape and living isolated lives. Sites of habitation are usually layered in their historic signature, with various periods of habitation evident on the same site over time, such as stone age sites (rock art and localised stone age scatter) farmsteads, stone kraals with their herder's cottages and more recent 20th century associated farm structures (sheds and seasonal labourers residence) and tourist cottages*

#### **Regional Cultural Landscape Elements**

A description of the regional cultural landscape elements according to the CLA (2022) is as follows:

- *This part of the Karoo is prized for its wide open spaces and expansive vistas. It is precisely the lack of development that gives this landscape its significance; a landscape which has supported continued patterns of use for millennia.*
- *The distinct remoteness of the semi-arid Karoo provided a refuge for the displaced San and later the Khoekhoen. This remote desert wilderness is an essential element to the Karoo cultural landscape's sense of place.*

- *Low shrubby vegetation dominates the landscape allowing for distant views of mountain ranges, with taller clusters of trees marking historic points such as cemeteries or farmsteads. Many of the endemic species hold medicinal value for local communities, making these significant as cultural resources.*
- *Although not immediately apparent on travelling through the landscape, significant stone age archaeology is common in the area; material cultural remnants of the prehistoric inhabitants of the landscape who lived in intimate dependence on and knowledge of the natural environment, shaping it and being shaped by it over time. This relatively undisturbed area is rich in archaeology, due to the presence of non-perennial water and includes stone tool scatters, rock paintings and herder kraals.*
- *Poorts and drifts which navigate the topography of ridges and riverine corridors. These natural crossing points, gaps between the mountain ranges, ridges and undulating hills, and shallower sections of river, have been used by animals and people as the places to traverse the landscape to water, forage, safety or settlements for centuries. These places, acting as funnels of movements across the landscape, therefore, may hold the material scatter of those who passed over them and, where identified historic tracks are still used, these are heritage elements of land use and one of the ways in which the landscape would have determined the movement and, therefore, settlement and interaction of people on the landscape.*
- *Distinct topographic features which can be seen from a distance over the vast plains between the mountain ranges have been used for millennia for navigation over the homogenous and flat terrain. These koppies have been critical in the survival and success of inhabitants and travellers over time, giving sense of place and orientation, most likely taking on spiritual significance for some groups. The shade and potential water source that they offer would have further raised the reliance on these features by inhabitants of the landscape.*
- *Scenic historic movement routes, tarred and gravel, connect the regional towns over the Komsberg Karoo landscape with distant dramatic views of mountain ranges. These movement routes and patterns to access have informed the settlement patterns of the region. Many of the roads and farm tracks in the study site as well as surrounding area are visible on maps dating back to the 18th and 19th centuries. As a landscape that maintains a dominant characteristic of survival, conflict and change, the roads and paths that cross this landscape are an essential element, connecting the significant points, places of refuge and conflict, trade and subsistence, to each other in a challenging space over time.*
- *A system of historic outspans that functioned as areas of rest for man and beast on the long and arduous journeys to the interior can be found in the area. The most notable being the one associated to Karooport. Two others are found at Platfontein and Brewelsfontein on the southern gravel route running parallel with the Bonteberg between Karooport and Beaufort West.*
- *A combination of the poort and scenic historic route elements, the historic Karooport, is an identified historic scenic route and declared Provincial Heritage Site. Historic mountain passes provided access between coastal plains and the remote interior, and their gateway conditions are typically associated with historical patterns of settlement (Winter and Oberholzer, 2014).*
- *The historic farms boundaries of the area date back to the late 19th century. As elements of historic land management, which would have considered access to water sources and grazing, these boundaries are part of the cultural landscape and the fencing and stone markers that mark these boundaries are considered of IIC heritage significance.*
- *Historic farmsteads with their associated agricultural structures and linking farm roads. Many of the farm werfs include historic structures, built in the regional architecture of packed local stone, now converted into dwellings or sheds. These farmsteads are mostly situated at points of lower elevation, nestled against the hills and ridges where the soils are more suitable for agriculture, and where nearby springs or other water sources supply water for livestock and limited cultivation of crops.*

- *Stone walls and kraals dot the landscape as remnants of stock keeping, road building and fortifications in the area.*
- *Agricultural landscape with livestock, mostly sheep and cattle; fencing and associated structures line and dot the landscape. These are evidence of the human landscape modifications and patterns of land use over millennia, including seasonal grazing and pastoral uses.*
- *The names of places and farms are testament to the relationship between man and nature, with illustrative Khoi, San, Afrikaans and Dutch names describing the interpretation and representation of the area.*
- *Game and nature reserves with live game and associated high fencing, drawing tourists to the region for game viewing and hunting. Game hunting has been continuous on this landscape for millenia since pre-historic inhabitants to the most recent tourist hunters, and attests to the ongoing relationship between humans and the environment in this region. Sadawa Private Game Reserve, Fair Game Farm, Sand River Conservancy, Vaalkloof Private Nature Reserve, Shamballa Sanctuary, Inverdoorn Game Reserve, Kareekloof Conservancy & Guest Farm all offer ecotourism opportunities with accommodation. Sothemba Lodge Guest Farm, Ibhadi Game Lodge, Snyderskloof, Keurkloof Cottage, Miskloof Farm Getaway, Blue Berry Hill Guest Farm offer accommodation and landscape-oriented experiences.*
- *Historic town settlements and landscapes, such as Ceres, Matjiesfontein, Touwsrivier and Laingsburg, associated to significant events in South Africa's history of survival, conflict and nation-building, including many provincial heritage sites which mark people and places of value to our national estate.*
- *Industrial elements of transmission lines, wind turbines and associated infrastructure are evident in the landscape and are fast altering the sense of place in the area.*

### **Findings and Recommendations**

The findings of this report, coupled with the proposed layout for development, concludes that the development can be permitted within the site if the report's recommendations are followed. The mitigating recommendations in this report consider the ecological, aesthetic, historic and socio-economic value lines that underpin the layers of significance that combine to create the character of the place and the cultural landscape of the Ceres Karoo. These recommendations include road and farmstead complex buffers which incorporate cultivated areas and graves, steep slope and ridgeline no-go areas as well as consideration of the unique land form of the site, CBA and ESA no-go areas, as well as mechanisms to support the non-landowner residents that live on the site in being bale to continue their indigenous land use patterns, knowledge and social systems. These mitigations will reduce the impact on the surrounding landscape and heritage resources but due to the high visual impact of the turbines, largely a result of their height, the negative impact to the cultural landscape cannot be removed, only reduced from very high to moderate.

The conclusion of this CLA study has culminated in the map showing location of proposed turbines and WEF infrastructure with the following heritage indicators and development buffers:

- Landscape unit C is suitable for sensitive WEF infrastructure development;
- A 500m buffer to either side of the district road for turbine and other infrastructure placement (Karee WEF does not propose turbines within this buffer) – due to existing gridlines within this road buffer, proposed option 1 for new gridlines is acceptable in its placement;
- 300m buffer to either side of identified significant historic farm roads for turbine placement, substation and laydown areas;
- 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 and no WEF roads running through farmstead complexes;

- Any additions or alterations to Tierberg homestead may require a NHRA Section 34 application if the building is found to be over 60yrs old;
- 200m freestanding graded heritage structure buffer for new roads and infrastructure;
- 100m buffer from cemetery or unmarked burial for all development;
- existing roads to be used with minimal upgrade as far as possible;
- riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archaeological) whichever is further (buffers not indicated).
- CBA and ESA no-go areas for all development (green shading – turbines 27 and 31), unless otherwise recommended by the biodiversity and environmental specialist studies for this site;
- Should any development be proposed for the CBAs or river drainage lines, a survey for potential historic sites will need to be completed before such development commences;
- Voetpadskloof gateway buffer included in the 300m farm road buffer and unit A.

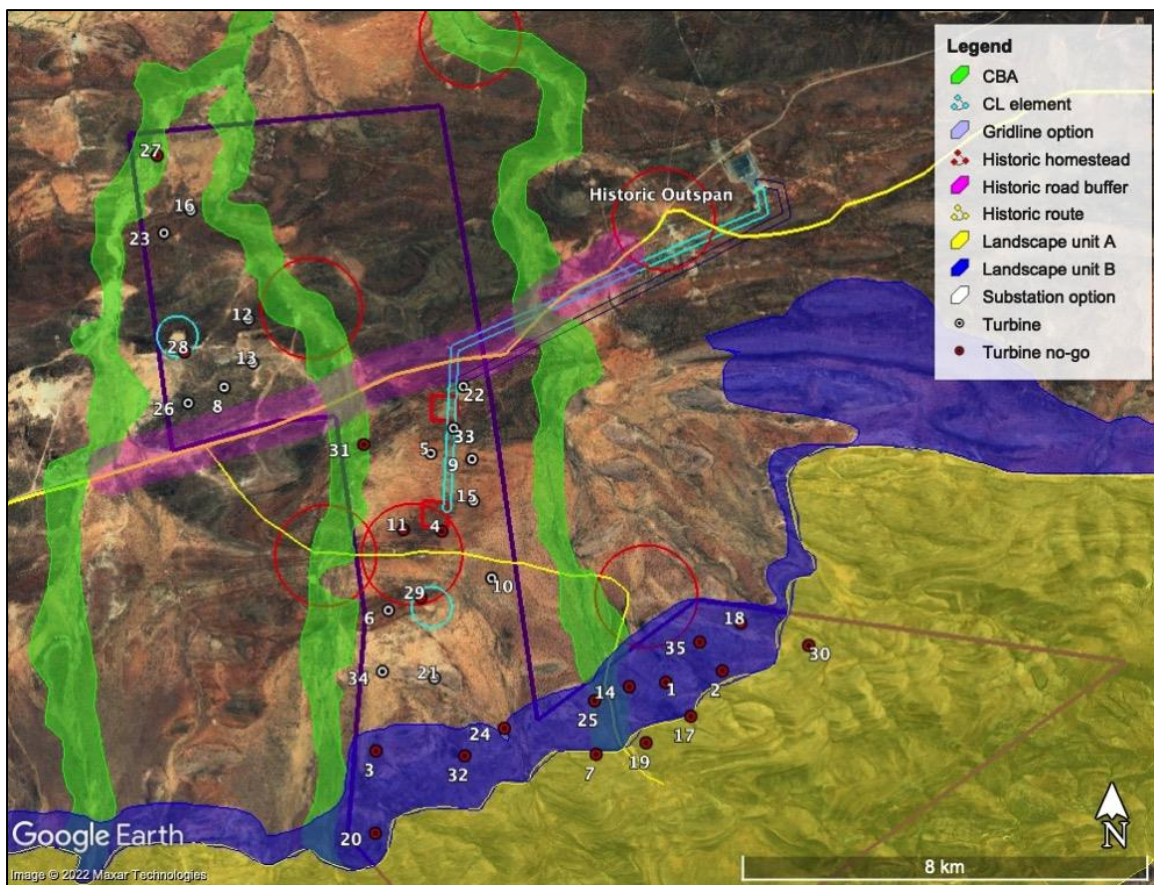


Figure 25: Cultural landscape assessment heritage indicators and buffers

### 10.2.3 Palaeontological

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

*“The two most potentially sensitive bedrock units within the WEF, BESS and grid connection project areas are (1) the Early Carboniferous Lake Mentz Subgroup at the top of the Witteberg Group (especially the Waaipoort Formation) and (2) the Early Permian Whitehill Formation. Bokkeveld and*

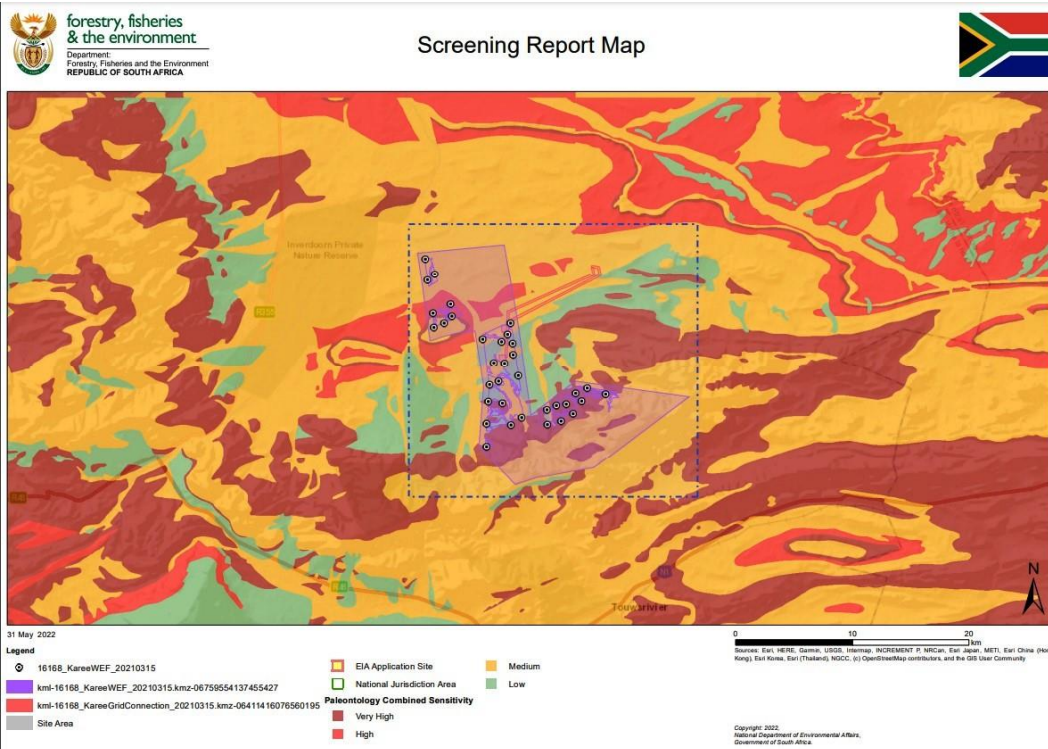
Witteberg Group formations stratigraphically below the Witpoort Formation that crop out in the folded core of the Bontberg Range will not be directly impacted by the proposed development and so are not treated further here.

According to the provisional palaeosensitivity map based on the DFFE Screening Tool, the Karee WEF and grid connection project areas includes outcrop areas of Low to Very High palaeosensitivity (**Figure 26**). 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 (e.g., the palaeontological sensitivity of the Witpoort Formation is exaggerated, while that of the Waaipoort Formation is underestimated).

#### **Palaeosensitivity of the WEF project area**

Only a handful of fossil sites have been recorded within the WEF project area during previous and recent palaeontological heritage site visits. Waaipoort Formation fossiliferous concretions are reported ...but the specimens found here so far are of limited scientific value. (N.B. GPS locality detail for some of the material illustrated by Almond 2016d is not currently available). None of these sparse fossil remains are rare or of significant scientific or conservation value. They represent forms that occur widely within the outcrop areas of the sedimentary formations concerned. Most of the Cape Supergroup and Karoo Supergroup rock units represented within the study area are generally of low to (at most) medium palaeosensitivity.... Important fossil biotas are known elsewhere in the Western Cape from fresh exposures of the Early Carboniferous Waaipoort and Early Permian Whitehill Formations but in the Karee WEF, BESS and grid connection project area these units are both very poorly exposed and often deeply weathered so their palaeosensitivity here is now low. Similar conclusions have been reached by the author and others in several previous palaeontological heritage reports for the Ceres Karoo region (e.g. Almond 2010a-c, 2015, 2016a-b, 2018, 2020a-d, Almond 2022, Butler 2018).

The overall palaeontological sensitivity of the Karee WEF project area is inferred to be generally LOW due to (1) poor sedimentary bedrock exposure, (2) high levels of tectonic cleavage development and (3) deep chemical weathering of mudrock facies. No high sensitivity fossil sites or palaeontological heritage No-Go areas were identified here during the present field survey.



**Figure 26: Paleontological sensitivity map for the Karee WEF, BESS and grid connection project areas.**

The sensitivity ratings for many of the rock units involved are erroneous, in the author's view. Due to the scarcity of well-preserved, scientifically important fossils over the great majority of this region, based on several desktop studies and recent palaeontological fieldwork, it is inferred that the WEF and grid connection project areas are in practice of LOW palaeontological sensitivity.

### 10.3 Transport

A Transportation Impact Assessment was undertaken by SiVEST SA (Pty) Ltd (November 2021).

The development is located in close proximity to the existing road network. A number of existing access points are located along Road DR01475 and in order to accommodate the adjusted land use, the access position will be relocated in order to obtain the recommended sight distances and remove it from its current location. An approval and a wayleave application will be required from the Western Cape Department of Transport & Public Works prior to work commencing. Minor upgrades to the external access road could be required on Road DR01475 in order to accommodate the larger Wind Turbine Generators (WTG's) planned for these facilities.

The construction / Balance of Plant (BoP) phase of this development will typically generate the highest number of additional vehicles. It will however be temporary, and impacts are considered to be nominal. A number of mitigation measures are proposed to accommodate the development and to reduce the impact to the surrounding road network.

It is SiVEST's opinion that the Karee WEF and associated 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 in this report are implemented, and hence the Environmental Authorisation (EA) should be granted for the BA application.

## 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. In this instance however, the area is not typically valued for its tourism significance and no formal protected areas were identified in the broader area. In addition, very few, leisure-based tourism activities, and no recognised tourism routes were identified in the study area.*

*In addition, it should be noted that the experience of the viewer is highly subjective and there are those who may perceive wind turbines, for example, 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.*

## 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 Karee 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<sup>2</sup> 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<sup>2</sup> 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.

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.

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

### **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<sup>5</sup> 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 corridors<sup>6</sup>, 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

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<sup>5</sup> Formally gazetted on 16 February 2018 (Government Notice 114)

<sup>6</sup> Formally gazetted on 16 February 2018 (Government Notice 113)



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<sup>7</sup>.

**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<sup>8</sup> 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];

<sup>7</sup> Formally Gazetted on 26 February 2021 (Government Notice 144)

<sup>8</sup> Formally Gazetted on 26 February 2021 (Government Notice 145)

- Municipal Systems Act (Act No. 32 of 2000) [MSA]; and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

## 12. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

In his 2021 State of the Nation Address, President Cyril Ramaphosa 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 mentioned 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 Generation (SSEG) plan that will support the management of renewable energy production 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 Karee Grid is being prepared to participate in the REIPPPP as well as potential bilateral offtake agreements. The overall objective of the proposed grid development is to feed the electricity generated from renewable energy technologies into the National grid.

### 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 (REIPPPP) 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](http://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 Karee 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 Karee WEF, Battery Energy Storage System (BESS) and shared 33/132kV on-site substation (separate 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 to which the Eskom portion (132kV portion/yard of the shared 33kV/132kV of the Karee WEF will connect facilitates this evacuation process. The Karee 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. 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 Karee 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<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>). 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”.*

### **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 in total, 300 semi-skilled, 100 skilled, 200 unskilled. 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.

## **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

There are several factors which are favourable for the placement of WEFs, power lines and substations at the proposed site location. This included land availability and topography, environmental sensitivities, distance to the national grid, wind resource, site accessibility and current land use. The project site for the WEF, power lines and substation has been identified based on wind resource, grid connection suitability, competition, topography, land availability and site access.

Only two site alternatives for the proposed development are being considered as the placement of the proposed substation is dependent on the location of the proposed Karee WEF.

#### Substation

Two (2) substation site alternatives are being considered and comparatively assessed by the EAP and specialists as follows:

3. **Option 1:** The location of the 33kv portion/yard of the shared 33/132kV onsite substation is located near an existing gravel road, making access to the onsite substation easier. The associated grid connection route to the Kappa Main Transmission Substation is shorter i.e. approximately 8.5km – 10.5km in length (Preferred).
4. **Option 2:** The location of the 33kv portion/yard of the shared 33/132kV onsite substation is located central to the land parcel, thereby reducing the energy loss associated with the wind turbines. The associated grid connection route to the Kappa Main Transmission Substation is slightly longer i.e. approximately 10.4km to 11.4km in length.

#### Grid Corridors

Two (2) 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 Karee 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 two (2) power line corridor route alignment alternatives. 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**

Two (2) 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. **Option 1:** The line from the 132kv portion/yard of the 33/132kv onsite substation moves northerly direction for about 0.5km and then turns right in a north easterly direction for about 7.5 km, then turns sharply in a north north westerly directly for about 0.5km and then turns left for about 0.5km in a west north westerly direction before terminating at the Kappa MTS. The associated grid connection route to the Kappa Main Transmission Substation is shorter i.e. approximately 8.5km – 10.5km in length (Preferred).
2. **Option 2:** The line from the 132kv portion/yard of the 33/132kv onsite substation moves in a northerly direction for about 3.2km, turning right in a north easterly direction for about 6.7 km and then left for about 0.5km in a northerly direction before terminating at the Kappa MTS. The associated grid connection route to the Kappa Main Transmission Substation is slightly longer i.e. approximately 10.4km to 11.4km in length.

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 assumes that the proposed project will not go ahead i.e., it is the option of not developing the proposed Karee Grid Connection. This alternative would result in no environmental, social or economic impacts (positive or negative) from the proposed project on the site or surrounding local area and has been assessed further by the specialists as outlined below.

The following implications will occur if the no-go alternative is implemented (i.e., the proposed project does not proceed):

- No benefits will be realised from the implementation of an additional land-use being energy generation and livestock farming;
- No additional power will be generated or supplied through means of renewable energy wind resources at this project at this location;
- There will be lost opportunity for skills transfer and education/training of local communities;

- The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realized;
- There will be a loss of job creation opportunities from the construction and operation phases, where job creation is identified as a key priority;
- Not contributing to future demand for additional power generation in a most economic and rapid manner.
- Loss of economic benefit to participating landowners due to the revenue that will be gained from leasing the land to the developer.
- No contribution to assist the government in addressing climate change, energy security and economic development.

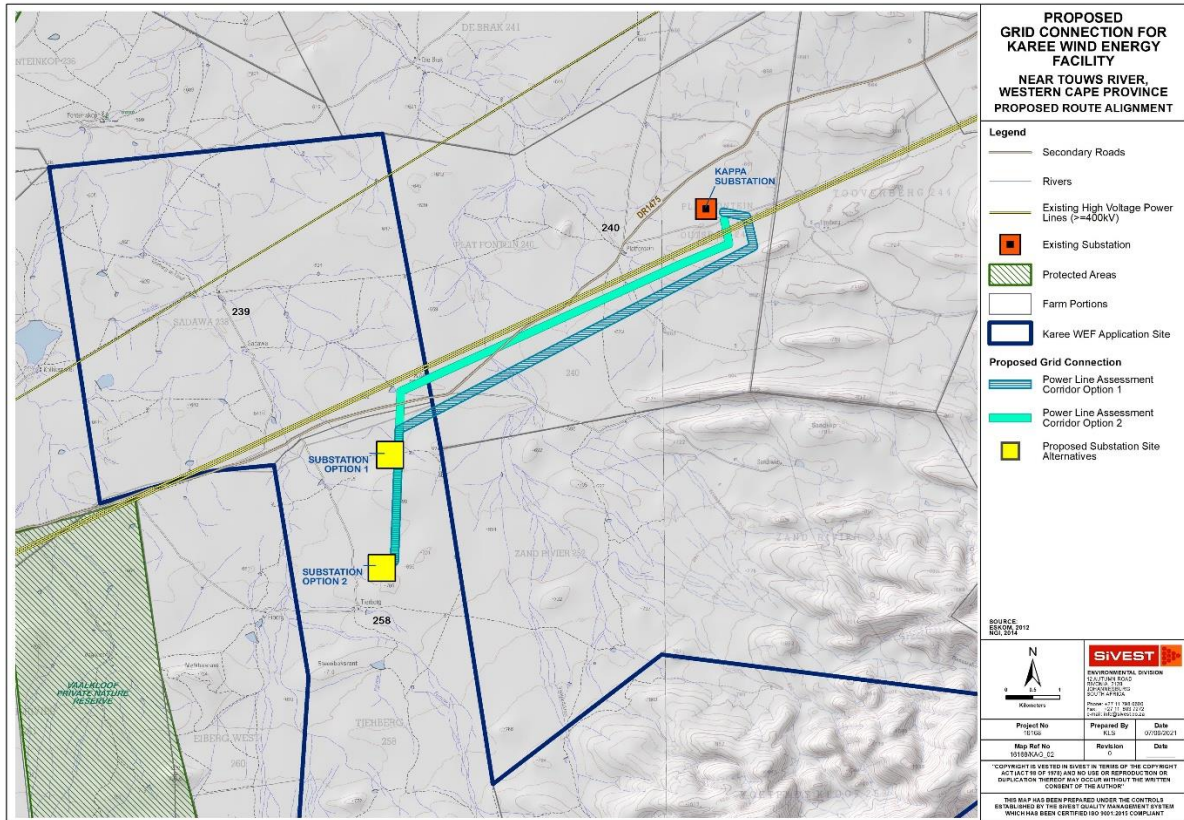
Contrary to the above, the following could occur if the no-go alternative is implemented:

- **Avifauna:** The No-Go option would result in no grid connection infrastructure being built on site. As a result, none of the impacts on birds described within the avifauna assessment would take place.
- **Socio-Economic:** The option of not having this project go ahead means that the social environment is not affected as the status quo remains. On a negative basis, it also means that all positive aspects associated with the project would not materialise. This would mean that there is no job creation, no revenue streams into the local economy and no opportunity to enhance the National Grid with renewable source of energy.
- **Terrestrial Ecology:** No biodiversity (fauna and flora) will be removed or disturbed during the development of this proposed facility.
- **Aquatic Ecology:** No aquatic resources will be impacted upon during the construction of the proposed WEF and associated infrastructure.
- **Visual:** No additional visual intrusion on the rural landscape and on settlements in the area by the proposed development.
- **Transport:** If the proposed development does not materialise the increase in the traffic volume will not transpire and the status quo will persist.
- **Heritage:** If the project were not implemented then the site would stay as it currently is (impact significance of neutral). Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.

The no- go alternative is not currently the preferred alternative.

#### 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 are shown in **Figure 27** below.



**Figure 27: Preliminary Layout showing the substation locations and power line corridors**

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**

<b>PREFERRED</b>	The alternative will result in a low impact / reduce the impact
<b>FAVOURABLE</b>	The impact will be relatively insignificant
<b>NOT PREFERRED</b>	The alternative will result in a high impact / increase the impact
<b>NO PREFERENCE</b>	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)	PREFERRED (YES / NO)
	Agric. and Soils	Avifauna	Bat	Terrestrial Ecology	Geotech	Archaeo	Palaeo	Cultural	Noise	Social	Surface Water	Transportation	Visual		
<b>SUBSTATION, BESS AND CONSTRUCTION LAYDOWN SITE ALTERNATIVES</b>															
Option 1	Not assessed	No Preference	Least preferred	Least preferred	No Preference	No Preference	No preference	Least preferred	No preference	No preference	Least preferred	No preference	Favourable	NO	NO
Option 2	Not assessed	No Preference	Favourable	Preferred	No Preference	No Preference	No preference	Least preferred	No preference	No preference	Preferred	No preference	Favourable	NO	YES

**Table 16: Summary of comparative assessment of power line corridors**

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





### 14.3 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.

#### 14.3.1 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, have been identified.

#### 14.3.2 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.

#### 14.3.3 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

#### **14.3.4 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**).

#### **14.3.5 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 Karee grid connection development constitutes a linear activity; however the landowner consent is required for the substation location.

The applicant is not the owner or the person in control of the land on which the Karee substation is proposed, therefore landowner consent is required and has been included as part of the application form. Furthermore, the landowners and/or occupants of the applicable farm portions will however be notified accordingly.

#### **14.3.6 Details of notification of Organs of State**

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**).

## **15. IMPACTS AND RISKS IDENTIFIED FOR THE PREFERRED ALTERNATIVE**

The SiVEST Impact Assessment method dated 28 July 2017 (attached as **Appendix G**) 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:

Table 17: Final Impact Assessment Table: Karee Grid

15.1 Planning

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL BEFORE MITIGATION									SIGNIFICANCE	RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL AFTER MITIGATION									SIGNIFICANCE
		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																						
Terrestrial Ecology – None identified																						
Agricultural – None identified																						
Avifaunal – None identified																						
Social – None Identified																						
Political and social resources	Corruption	4	2	2	3	4	2	30	-	Medium			4	2	2	3	4	2	30	-	Medium	
<b>Archaeology</b>																						
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 commences. 2. Implement a 30-meter buffer around archaeological sites with a rating of IIIB (Karee_12, Karee_15). 3. Implement a 100-meter buffer around the rock art site (Karee_6) 4. A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations. 5. 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. 6. Demarcate as no-go areas	1	2	3	3	4	2	26	-	Medium		
Unidentified heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	28	-	Medium	A management plan, after a walkdown of the final layout, for the heritage resources needs then to be compiled and approved for implementation during construction and operations.	1	3	4	2	4	1	14	-	Low		
<b>Heritage</b>																						
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 commences. 2. Implement a 30-meter buffer around archaeological sites with a rating of IIIB (Karee_12, Karee_15). 3. Implement a 100-meter buffer around the rock art site (Karee_6) 4. A management plan for the heritage resources needs then to be compiled and approved for implementation during	1	2	3	3	4	2	26	-	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									
														construction and operations. 5. 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. 6. Demarcate as no-go areas															
Unidentified heritage resources (Chance finds)	Destruction or damage to previously unidentified archaeological or historical resources	1	3	4	2	4	2	28	-	Medium	1	3	4	2	4	1	14	-	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	1	1	4	2	4	1	12	-	Low										
Cultural Landscape Ecological	Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape	2	4	3	3	3	4	60	-	High	2	2	2	1	3	2	20	-	Low										
Cultural Landscape	Inappropriate infrastructure layout planning negates aesthetic and sense of place	2	4	4	4	3	4	68	-	Very High	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		
Aesthetic	requirements of the cultural landscape.											development of the wind turbines or any associated development during all phases. <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>										
Cultural Landscape Historic	Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	2	4	3	4	4	4	68	-	Very High	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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</li> </ul>	2	2	1	2	4	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
												character of the Karoo landscape, and often on the mid-slopes. <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>								
Cultural Landscape 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	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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</li> </ul>	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
												to the character.								
Cultural Landscapes																				
Ecological	Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	2	4	3	3	3	4	60	-	High	<ul style="list-style-type: none"> <li>CBAs, and ESAs (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	2	2	2	1	3	2	20	-	Low
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	<ul style="list-style-type: none"> <li>Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration.</li> <li>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</li> </ul>	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			
												<ul style="list-style-type: none"> <li>cultural landscape.</li> <li>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.</li> <li>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.</li> <li>Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Alternative Option 2 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.</li> <li>Neither substation option location is preferred as they are proposed for slopes of 3%-10% which would increase their visibility in the flat terrain of the surrounding alluvial plains. An option should be found in an area below 3% slope without impacting on the CBAs or other cultural landscape buffers.</li> <li>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</li> </ul>											

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S										
														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	<ul style="list-style-type: none"> <li>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.</li> <li>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 historic farmsteads as far possible to limit impact to the farmsteads.</li> <li>A 500m buffer around Tierberg homestead for turbines is sufficient due to its being a relatively recent addition to the landscape.</li> <li>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.</li> <li>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.</li> <li>Burial grounds and places of worship are automatically</li> </ul>	2	2	2	1	3	2	20	-	Low										

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	
												<p>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 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.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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 (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails.</li> <li>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.</li> <li>Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.</li> </ul>									
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	<ul style="list-style-type: none"> <li>The findings of this report must be shared with identified interested and affected parties, including non-landowner residents on the development properties, in the EIA public participation process in order to further ascertain any intangible cultural</li> </ul>	2	2	1	2	4	2	22	-	Low	



15.2 Construction

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
<b>Aquatic / Freshwater</b>																				
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 service 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 specialist 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	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	1	3	2	2	3	3	33	-	Medium	<ul style="list-style-type: none"> <li>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.</li> <li>Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in</li> </ul>	1	3	2	1	2	2	18	-	Low

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	
decommissioning phases	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											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;									
<b>Terrestrial Ecology</b>																					
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;	1	3	2	1	2	2	18	-	Low	

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												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.																
<b>Agricultural – None identified</b>																												
<b>Avifaunal</b>																												
Avifauna	Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	1	4	2	3	1	3	33			Medium	(1) Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. (2) Measures to control noise and dust should be applied according to current best practice in the industry.	1	4	2	3	1	2	22									Low
Avifauna	Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure.	1	3	2	2	3	2	22			Low	(1) Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction. (2) Construction of new roads should only be considered if existing roads cannot be upgraded. (3) The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.	1	2	2	2	3	2	20									Low
<b>Geotechnical</b>																												
Disturbance/displacement/removal of soil and rock	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	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	1	1	2	1	7	-								Low
<b>Social</b>																												
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	

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S								
	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
<b>Cultural Landscapes</b>																												
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	<ul style="list-style-type: none"> <li>CBAs, and ESAs (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	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	<ul style="list-style-type: none"> <li>Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration.</li> <li>Avoid development of infrastructure (such as buildings,</li> </ul>	2	4	2	2	2	2	24	-	Medium								



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												<p>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.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• Alternative Option 2 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.</li> <li>• Neither substation option location is preferred as they are proposed for slopes of 3%-10% which would increase their visibility in the flat terrain of the surrounding alluvial plains. An option should be found in an area below 3% slope without impacting on the CBAs or other cultural landscape buffers.</li> <li>• 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</li> </ul>									

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												light pollution on a long term and ongoing basis.															
Historic	Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	2	4	4	3	4	4	68	-	very high	<ul style="list-style-type: none"> <li>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.</li> <li>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 historic farmsteads as far possible to limit impact to the farmsteads.</li> <li>A 500m buffer around Tierberg homestead for turbines is sufficient due to its being a relatively recent addition to the landscape.</li> <li>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.</li> <li>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.</li> <li>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 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.</li> <li>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.</li> <li>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 (b) Retain old roadways, which have been</li> </ul>	2	2	3	2	2	2	22	-	low							

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													replaced by newer roads, for use as recreation trails.														
Socio-economic	Integrity of local residents to continue their patterns of land use is degraded by the construction and decommissioning activities.	2	3	4	4	4	4	68	-	very high	<ul style="list-style-type: none"> <li>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.</li> <li>Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.</li> </ul>	1	3	3	1	3	2	22	-	low							
<b>Heritage (Palaeontology)</b>																											
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							
<b>Noise</b>																											
Noise impacts during the day	Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	2	1	1	2	1	1	7	-	Low	No mitigation measures recommended for construction activities at the WTG locations or for substations	2	1	1	2	1	1	7	-	Low							

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Noise impacts at night	Construction activities relating to civil works as well as erection of wind turbines	2	2	1	2	1	4	32	-	Medium	Night-time construction activities closer than 1,000 m from NSD 06 to be minimized.	2	1	1	2	1	1	8	-	Low		
<b>Transport</b>																						
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	Medium	<ul style="list-style-type: none"> <li>Ensure staff transport is done in the 'off peak' periods and by bus.</li> <li>Stagger material, component and abnormal loads delivery</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> </ul>	2	4	1	2	1	2	20	-	Low		
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	Medium	<ul style="list-style-type: none"> <li>Reduction in speed of vehicles</li> <li>Upgrade of existing / new access points</li> <li>Adequate enforcement of the law</li> <li>Implementation of pedestrian safety initiatives</li> <li>Regular maintenance of farm fences &amp; access cattle grids</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> </ul>	2	3	2	4	1	1	12	-	Low		
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	Low	<ul style="list-style-type: none"> <li>Upgrade of existing / new access point</li> <li>Reduction in speed of the vehicles</li> <li>Construction of gravel roads in terms of TRH20</li> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> <li>Possible use of an approved dust suppressant techniques</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> </ul>	2	3	2	2	1	2	20	-	Low		
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> <li>Construction of an on-site batching plant to reduce trips.</li> </ul>	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 Roads Access	Increase in Dust from gravel roads	1	4	1	1	1	2	16	-	Low	<ul style="list-style-type: none"> <li>Enforce a maximum speed limit on the development</li> <li>Appropriate, timely and high quality maintenance required in terms of TRH20</li> <li>Possible use of an approved dust suppressant techniques</li> </ul>	1	3	1	1	1	2	14	-	Low		
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> <li>Adequate road signage according to the SARTSM • Approval from the respective roads department</li> </ul>	1	4	1	2	1	1	9	-	Low		
<b>Visual</b>																						

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		
1. Potential alteration of the visual character and sense of place  Potential visual impact on receptors in the study area	<p>1. 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.</p> <p>2. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</p> <p>3. Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</p> <p>4. 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.</p> <p>5. 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.</p>	2	3	1	2	1	2	18	-	Low	2	2	1	2	1	2	16	-	Low	<p>2. Carefully plan to minimise the construction period and avoid construction delays.</p> <p>3. Inform receptors within 1km of the WEF development area of the construction programme and schedules.</p> <p>4. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</p> <p>5. Vegetation clearing should take place in a phased manner.</p> <p>6. Maintain a neat construction site by removing rubble and waste materials regularly.</p> <p>7. Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.</p> <p>8. Where possible, underground cabling should be utilised.</p> <p>9. Make use of existing gravel access roads where possible.</p> <ul style="list-style-type: none"> <li>▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible.</li> <li>▪ Ensure that dust suppression techniques are implemented: <ul style="list-style-type: none"> <li>▪ on all access roads;</li> <li>▪ in all areas where vegetation clearing has taken place;</li> </ul> </li> <li>• on all soil stockpiles.</li> </ul>		

### 15.3 Operation

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		
<b>Aquatic / Freshwater</b>																						
Impact 4 Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase	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.	2	3	2	2	3	3	36	-	Medium	<ul style="list-style-type: none"> <li>• 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 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</li> </ul>	1	1	1	1	1	1	5	-	Low		
<b>Terrestrial Ecology</b>																						

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 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	<p>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;</p> <p>Educate contractors as to the importance of the undisturbed conservations areas and importance of avoiding them;</p> <p>All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr;</p> <p>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.</p>	1	3	2	1	2	2	18	-	Low
<b>Agricultural – None identified</b>																				
<b>Avifaunal</b>																				
Avifauna	Mortality of priority species due to collisions with the wind turbines.	2	3	2	3	3	3	39	-	Medium	<p>(1) No turbines should be located in the buffer zones around major drainage lines, waterpoints and dams.</p> <p>(2) A 3.7km circular high-risk turbine exclusion zone must be implemented around the Verreaux's Eagle nests 1 – 9 to the south of the PAOI,</p> <p>(3) A 5km high-risk turbine exclusion zone must be implemented around the Martial Eagle present tower 26 of the Kappa – Muldersvlei 1 transmission line.</p> <p>(4) Any planned turbines within the 3.7 – 5.2km circular medium-risk buffer zone around the Verreaux's Eagle nests 1 – 9 must be subjected to an additional year of monitoring to determine the risk that these turbines pose to Verreaux's Eagles, to establish whether they could be effectively mitigated, or will have to be removed.</p> <p>(5) Live-bird monitoring and carcass searches should be implemented in the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins <i>et al.</i> 2015) to assess collision rates.</p> <p>(6) If at any time estimated collision rates indicate unacceptable mortality levels of priority species, i.e., if it exceeds the mortality threshold determined by the avifaunal specialist after consultation with other avifaunal specialists and BirdLife South Africa, additional measures will have to be implemented which could include shut down on demand or other proven measures.</p>	2	2	2	2	3	2	22	-	Low
Avifauna	Mortality of priority species due to electrocutions on the overhead sections of the internal 33kV cables.	2	3	1	3	3	2	24	-	Medium	<p>(1) Underground cabling should be used as much as is practically possible.</p> <p>(2) If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g., insulation of live components to prevent electrocutions on terminal structures and pole transformers.</p> <p>(3) Regular inspections of the overhead sections of the internal reticulation network must be conducted during the operational phase to look for carcasses, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins <i>et al.</i> 2015).</p>	2	2	1	2	3	1	10	-	Low

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Avifauna	Mortality due to collisions with the overhead sections of the internal 33kV cables.	2	3	2	3	3	2	26	-	Medium	Bird flight diverters should be installed on all the overhead line sections for the full span length according to the applicable Eskom standard at the time.	2	1	1	2	3	1	9	-	Low
<b>Geotechnical</b>																				
Soil Erosion	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
<b>Social</b>																				
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
	Blade glint (only applicable to WEF)	2	4	1	2	3	2	24	-	Low		2	2	1	2	3	2	20	-	Low
	Electromagnetic field (EMFs)	1	3	1	2	3	2	20	-	Low		1	2	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
	Shadow flicker (only applicable to WEF)	1	3	1	2	3	2	20	-	Low		1	2	1	2	3	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		4	4	1	3	3	3	45	+	High
<b>Archaeology – None identified</b>																				
<b>Cultural Landscapes</b>																				
Ecological	Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	1	4	4	2	3	4	56	-	High	<ul style="list-style-type: none"> <li>Areas of endemic and endangered natural vegetation should be conserved.</li> <li>CBAs, and ESAs (along drainage lines), should be protected.</li> <li>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.</li> <li>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.</li> </ul>	1	1	4	2	3	2	22	-	Low

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
												<ul style="list-style-type: none"> <li>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.</li> <li>Water use for the operational phase of the development must not negatively impact on the water resources in the area and must not negatively impact on the access or usage of water and water infrastructure for local inhabitants.</li> </ul>								
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	<ul style="list-style-type: none"> <li>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.</li> <li>Prevent the construction of new buildings/structures on visually sensitive, steep (over 3%), elevated or exposed slopes, ridgelines and hillcrests or within 1000m of the farmsteads and 500m of the district roads.</li> <li>Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads.</li> <li>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.</li> <li>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.</li> </ul>	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	<ul style="list-style-type: none"> <li>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</li> </ul>	2	2	4	2	4	2	28	-	Medium



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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	
												<ul style="list-style-type: none"> <li>features.</li> <li>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.</li> <li>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 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.</li> <li>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.</li> <li>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.</li> <li>Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left intact 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 travelers.</li> <li>Where the historic function of a building/site is still intact, the function has heritage value and should be protected.</li> <li>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 Karee should be maintained and integrity as a communal road for farm residents must be retained.</li> <li>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.</li> <li>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</li> </ul>									

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S								
													operate at speeds that reduce dust and noise as far possible. <ul style="list-style-type: none"> <li>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 (b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails.</li> </ul>															
Socio-economic	Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	2	4	3	4	4	4	68	-	very high		<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Local residents must be offered employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</li> <li>Local residents must be offered employment training opportunities associated with WEF developments at all phases.</li> <li>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.</li> </ul>	2	3	2	2	3	2	24	+	Medium							
<b>Noise</b>																												
Noise Impacts during the day	Noises from operating wind turbines	2	1	1	2	3	1	9	-	Low		No mitigation measures recommended for daytime operational activities	2	1	1	2	3	1	9	-	Low							
Noise Impacts at night	Noises from operating wind turbines	2	3	1	3	3	3	36	-	Medium		Developer can move the WTG located closer than 800 m from NSD 06, or, the developer can make use of a mitigated wind turbine with a sound power emission level less than 107.2 dBA	2	1	1	3	3	1	10	-	Low							
<b>Transport</b>																												
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							

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		
	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		
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 Roads Access	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		
<b>Visual</b>																						
<ul style="list-style-type: none"> <li>Potential alteration of the visual character and sense of place.</li> <li>Potential visual impact on receptors in the study area.</li> </ul> <p>Potential visual impact on the night time visual environment.</p>	<ul style="list-style-type: none"> <li>The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.</li> <li>Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.</li> <li>The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.</li> </ul>	2	3	3	3	3	2	28	-	Medium	<p><u>Design Phase</u></p> <p>Ensure that wind turbines are not located within 1km of any farmhouses in order to minimise visual impacts on these dwellings.</p> <p>Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity.</p> <p>Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter.</p> <p>Where possible, underground cabling should be utilised.</p> <p><u>Operational Phase</u></p> <p>Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.</p> <p>Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).</p> <p>If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact.</p> <p>As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</p> <p>Ensure that dust suppression techniques are implemented on all gravel access roads.</p>	2	3	3	2	2	2	24	-	Medium		

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S										
													As far as possible, limit the amount of security and operational lighting present on site. Light fittings for security at night should reflect the light toward the ground and prevent light spill. Lighting fixtures should make use of minimum lumen or wattage. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. If possible, make use of motion detectors on security lighting. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. The operations and maintenance (O&M) buildings should not be illuminated at night.																	

#### 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		
<b>Aquatic / Freshwater</b>																						
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	<ul style="list-style-type: none"> <li>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.</li> <li>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).</li> <li>Mechanical plant and bowlers must not be refuelled or serviced within 100m of a river channel.</li> <li>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.</li> <li>Littering and contamination associated with construction activity must be avoided through effective construction camp</li> </ul>	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							
												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;															
<b>Terrestrial Ecology</b>																											
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							
<b>Agricultural – None identified</b>																											
<b>Avifaunal</b>																											

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
Avifauna	Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	1	4	1	2	1	2	18		Low	(1) Dismantling activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. (2) Measures to control noise and dust should be applied according to current best practice in the industry.	1	3	1	2	1	2	16		Low
<b>Geotechnical</b>																				
Disturbance/displacement/removal of soil and rock	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	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
<b>Social – None identified</b>																				
<b>Archaeology – None identified</b>																				
<b>Heritage (Palaeontology) – None identified</b>																				
<b>Noise</b>																				
Noise impacts during the day	Decommissioning activities relating to removal of infrastructure and wind turbines, rehabilitation of disturbed areas	1	1	1	2	1	1	6	-	Low	• No mitigation measures recommended for decommissioning activities for WTGs or substations	1	1	1	2	1	1	6	-	Low
<b>Transport</b>																				
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 • 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.	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
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> </ul>	2	3	2	2	1	2	20	-	Low
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> <li>Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery.</li> <li>Adequate enforcement of the law</li> </ul>	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	<ul style="list-style-type: none"> <li>Enforce a maximum speed limit on the development. Appropriate, timely and high quality maintenance required in terms of TRH20</li> <li>Possible use of an approved dust suppressant techniques</li> </ul>	1	3	1	1	1	2	14	-	Low
	New / Larger Access points	1	4	1	2	1	1	9	-	Low	<ul style="list-style-type: none"> <li>Adequate road signage according to the SARTSM</li> <li>Approval from the respective roads department</li> </ul>	1	4	1	2	1	1	9	-	Low
<b>Visual</b>																				
10. Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;	1. Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.	2	3	1	2	1	2	18	-	Low	13. All infrastructure that is not required for post-decommissioning use should be removed. 14. Carefully plan to minimize the decommissioning period and avoid delays. 15. Maintain a neat decommissioning site by removing rubble and waste materials regularly. 16. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. 17. All cleared areas should be rehabilitated as soon as possible.  • Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	2	1	2	16	-	Low
11. Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and	3. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.																			
12. Potential visual intrusion of any remaining infrastructure on the site.	4. Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment.																			
	5. 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.																			

### 15.5 Cumulative

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION	RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION
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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S											E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
<b>Aquatic / Freshwater</b>																													
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									
<b>Terrestrial Ecology</b>																													
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									
<b>Agricultural</b>																													
<b>Avifaunal</b>																													
Avifauna	1. Mortality due to collisions with the wind turbines 2. Displacement due to disturbance during construction and operation of the wind farm 3. Displacement due to habitat change and loss at the wind farm 4. Mortality due to electrocution on the electrical infrastructure	1	4	2	3	3	3	39	-	Medium	All the mitigation measures listed in the various bird specialist studies compiled for the eleven (11) renewable energy facilities within a 35km radius around the project.	1	2	2	3	3	2	22	-	Low									
<b>Geotechnical</b>																													
Disturbance/displacement/removal of soil and Rock Soil Erosion	No cumulative effect							0										0											
<b>Social</b>																													
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 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																			



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		
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												
	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												
<b>Archaeology</b>																						
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		

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
<b>Heritage (Palaeontology)</b>																				
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
<b>Cultural Landscape</b>																				
Ecological	Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	3	4	4	3	4	4	72	-	Very High	<ul style="list-style-type: none"> <li>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.</li> <li>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;</li> <li>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. (</li> </ul>	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
<b>Noise</b>																				
Increased noise levels	Cumulative noises due to operating wind turbines from other wind energy facilities in the area	2	1	1	3	3	1	10	-	Low	No mitigation measures recommended	2	1	1	3	3	1	10	-	Low
<b>Transport</b>																				
Increase in Road Maintenance	Increase in Traffic	2	4	1	2	1	4	40	-	Medium	<ul style="list-style-type: none"> <li>Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus.</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> <li>Coordination between all developers in the area</li> </ul>	2	4	1	2	1	3	30	-	Medium
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	3	39	-	Medium	<ul style="list-style-type: none"> <li>Reduction in speed of vehicles</li> <li>Adequate enforcement of the law</li> <li>Implementation of pedestrian safety initiatives</li> <li>Regular maintenance of farm fences, access cattle grids</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> </ul>	2	3	2	4	1	2	24	-	Medium

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S						
												<ul style="list-style-type: none"> <li>Coordination between all developers in the area</li> </ul>														
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	Medium	<ul style="list-style-type: none"> <li>Reduction in speed of the vehicles</li> <li>Construction of gravel roads in terms of TRH20</li> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> <li>Possible use of an approved dust suppressant techniques</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> <li>Coordination between all developers in the area</li> </ul>	2	3	2	2	1	2	20	-	Low						
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	Low	<ul style="list-style-type: none"> <li>Implement a road maintenance program under the auspices of the respective transport department.</li> <li>Construction of an on-site batching plant and tower construction to reduce trips.</li> <li>Coordination between all developers in the area</li> </ul>	2	3	2	2	2	22	-	Low							
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	36	-	Medium	<ul style="list-style-type: none"> <li>Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods.</li> <li>Adequate enforcement of the law</li> <li>Coordination between all developers in the area</li> </ul>	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	<ul style="list-style-type: none"> <li>Enforce a maximum speed limit on the development</li> <li>Appropriate, timely and high quality maintenance required in terms of TRH20</li> <li>Possible use of an approved dust suppressant techniques</li> </ul>	1	3	1	1	1	2	14	-	Low						
	New / Larger Access points	1	4	1	2	1	2	18	-	Low	<ul style="list-style-type: none"> <li>Adequate road signage according to the SARTSM</li> <li>Approval from the respective roads department</li> </ul>	1	4	1	2	1	1	9	-	Low						
<b>Visual</b>																										
Potential alteration of the visual character and sense of place in the broader area.	Additional renewable energy 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.	3	3	2	3	3	2	28	-	Medium	<ul style="list-style-type: none"> <li>Carefully plan to minimise the construction period and avoid construction delays.</li> </ul>	3	3	2	2	2	2	24	-	Medium						
Potential visual impact on receptors in the study area.	Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.										<ul style="list-style-type: none"> <li>Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.</li> <li>Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</li> </ul>															
Potential visual impact on the night time visual	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.										<ul style="list-style-type: none"> <li>Vegetation clearing should take place in a phased manner.</li> <li>Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.</li> <li>As far as possible, limit the number of maintenance vehicles which</li> </ul>															

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
environment.	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.											are allowed to access the facility. Ensure that dust suppression techniques are implemented on all gravel access roads. As far as possible, limit the amount of security and operational lighting present on site. Light fittings for security at night should reflect the light toward the ground and prevent light spill. Lighting fixtures should make use of minimum lumen or wattage. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. If possible, make use of motion detectors on security lighting. The operations and maintenance (O&M) buildings should not be illuminated at night. The O&M buildings should be painted in natural tones that fit with the surrounding environment.								

## 16. POSITIVE AND NEGATIVE IMPACTS OF THE KAREE 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
<b>PLANNING</b>		
<b>Socio-economic</b>		
Corruption	Negative Medium	Negative Medium
<b>Archaeology</b>		
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.	Negative High	Negative Medium
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	Negative Medium	Negative Low
<b>Heritage</b>		
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.	Negative High	Negative Medium
Destruction or damage to previously unidentified archaeological or historical resources	Negative Medium	Negative Low
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations	Negative Low	Negative Low
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape	Negative High	Negative Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Negative Very High	Negative Low
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Negative Very High	Negative 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.	Negative Very High	Negative Low
<b>Cultural Landscapes</b>		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	Negative High	Negative Low
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	Negative Very High	Negative Medium
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	Negative Very High	Negative 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.	Negative Very High	Negative Low
<b>Noise</b>		
Light delivery vehicles moving around onsite.	Low	Low
<b>CONSTRUCTION</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Avifaunal</b>		
Displacement due to disturbance associated with the construction of the wind turbines and associated infrastructure.	Negative Medium	Negative Low

Impact	Pre-mitigation	Post-mitigation
Displacement due to habitat transformation associated with the construction of the wind turbines and associated infrastructure.	Negative Low	Negative Low
<b>Agriculture</b>		
<b>Bat</b>		
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 dense bushes. The removal of limited trees and bushes would have an impact on all bats that could potentially roost in and on the foraging habitat of clutter and clutter-edge species	Negative Medium	Negative Low
Creating new habitat amongst the turbines which might attract bats. This includes buildings with roofs that could serve as roosting space or open water sources from quarries or excavation where water could accumulate.	Negative Low	Negative Low
Construction noise, especially during night-time, as well as lighting disturbance.	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
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	Negative Low	Negative 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.	Negative Medium	Negative Low
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Negative Medium	Negative Low
<b>Transport</b>		
Increase in Traffic	Negative Medium	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Geotech</b>		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	Negative Low	Negative Low
Increased erosion due to vegetation clearing, alteration of natural drainage	Negative Low	Negative Low
<b>Aquatic/ Freshwater</b>		

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	Negative Low	Negative Low
Construction could result in the loss of drainage systems that are fully functional and provide an ecosystem service 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	Negative Medium	Negative 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	Negative Medium	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Availability of community services	Negative Low	Positive Low
Cultural and historic resources	Negative Medium	Negative Medium
Social and community infrastructure	Negative Low	Negative Low
Annoyance, dust and noise	Negative Low	Negative Low
Crime and security	Negative Medium	Negative Low
Daily living patterns	Negative Low	Negative Low
Employment and business opportunities	Positive Low	Positive Low
Farming operations	Negative Low	Negative Low
Fire hazard	Negative Low	Negative Low
Hazard exposure	Negative Low	Negative Low
STDs, HIV and AIDS	Negative Medium	Negative Medium
Risk to livestock	Negative Low	Negative Low
Temporary influx of construction workers	Negative Low	Negative Low
Informal development and settlements	Negative Low	Negative Low
<b>Heritage (Palaeontology)</b>		

Impact	Pre-mitigation	Post-mitigation
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Negative Low	Negative Low
<b>Cultural Landscapes</b>		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	Negative High	Negative Low
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	Negative High	Negative Medium
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	Negative Very High	Negative Low
Integrity of local residents to continue their patterns of land use is degraded by the construction and decommissioning activities.	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.</li> <li>Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</li> <li>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.</li> </ul>	Negative Low	Negative Low
<b>OPERATIONAL</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
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.	Negative Medium	Negative Low
<b>Agricultural - compliance statement</b>		
<b>Noise</b>		
Noises from operating wind turbines- Day	Negative Low	Negative Low
Noises from operating wind turbines- Night	Negative Medium	Negative Low
<b>Terrestrial Ecology</b>		
Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	Negative Medium	Negative Low
<b>Avifaunal</b>		
Mortality of priority species due to collisions with the wind turbines.	Negative Medium	Negative Low
Mortality of priority species due to electrocutions on the overhead sections of the internal 33kV cables.	Negative Medium	Negative Medium
Mortality due to collisions with the overhead sections of the internal 33kV cables.	Negative Medium	Negative Low
<b>Bat</b>		



Impact	Pre-mitigation	Post-mitigation
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying species have predominantly been confirmed at the proposed Karee WEF site.	Negative High	Negative High
Bat fatality during migration. A limited number of calls like <i>Miniopterus natalensis</i> (Natal Long-fingered bat), a Near Threatened migration species, have been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	Negative Medium	Negative Low
Some calls like the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	Negative Medium	Negative Low
Bat mortality due to the attraction of bats to wind turbines (Horn, et al., 2008). Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	Negative Medium	Negative Low
Loss of habitat and foraging space during operation of the wind turbines.	Negative Medium	Negative Medium
Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	Negative High	Negative Medium
<b>Transport</b>		
Increase in Traffic	Negative Low	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Geotech</b>		
Increased erosion due to alteration of natural drainage	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		

Impact	Pre-mitigation	Post-mitigation
Vulnerability of small enterprises	Negative Low	Negative Low
Land use	Negative Low	Negative Low
Livelihoods and ecosystem services	Negative Low	Negative Low
Blade glint (only applicable to WEF)	Negative Low	Negative Low
Electromagnetic field (EMFs)	Negative Low	Negative Low
Employment after construction	Negative Low	Negative Low
Shadow flicker (only applicable to WEF)	Negative Low	Negative Low
Transformation of the sense of place	Negative Medium	Negative Medium
Security of electricity supply	Positive High	Positive High
<b>Cultural Landscapes</b>		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	Negative High	Negative Low
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative High	Negative Medium
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	Negative Very High	Positive Medium
<b>Visual</b>		
The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. 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 will be altered as a result of operational and security lighting at the proposed WEF.	Negative Medium	Negative Medium
<b>DECOMMISSIONING</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Agriculture</b>		
<b>Aquatic/ Freshwater</b>		

Impact	Pre-mitigation	Post-mitigation
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	Negative Medium	Negative Low
<b>Bat</b>		
Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	Negative Low	Negative Low
<b>Avifaunal</b>		
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
Loss and disturbance of natural vegetation due to the removal of infrastructure and need for working sites	Negative Low	Negative Low
Continued establishment and spread of alien invasive plant species due to the presence of migration corridors and disturbance vectors	Negative Medium	Negative Low
<b>Geotech</b>		
Ground disturbance during platform earthworks, road rehabilitation, removal of subsurface infrastructure	Negative Low	Negative Low
Increased erosion due to ground disturbance during rehabilitation activities	Negative Low	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic- None Identified</b>		
<b>Noise</b>		
Decommissioning activities relating to removal of infrastructure and wind turbines, rehabilitation of disturbed areas	Negative Low	Negative Low
<b>Transport</b>		
Increase in Traffic	Negative Medium	Negative Low
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Low	Negative Low
Increase in Dust from gravel roads	Negative Low	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Heritage – None Identified</b>		
<b>Visual</b>		
• Vehicles and equipment required for decommissioning will alter the natural	Negative	Negative

Impact	Pre-mitigation	Post-mitigation
character of the study area and expose visual receptors to visual impacts. <ul style="list-style-type: none"> <li>Decommissioning activities may be perceived as an unwelcome visual intrusion.</li> <li>Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.</li> <li>Surface disturbance during decommissioning would expose bare soil (scarring) which could visually surrounding environment.</li> <li>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.</li> </ul>	Low	Low
<b>CUMULATIVE</b>		
<b>Impacts to Biophysical Systems</b>		
<b>Aquatic / Freshwater</b>		
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	Negative Low	Negative Low
<b>Terrestrial Ecology</b>		
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	Negative Low	Negative Low
<b>Agricultural</b>		
<b>Bat</b>		
Cumulative effect of destruction of active roost of several WEFs as well as features that could serve as potential roosts	Negative High	Negative Low
Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	Negative High	Negative High
Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several WEFs	Negative High	Negative Medium
Habitat loss over several WEFs	Negative High	Negative High
Cumulative reduction in the size, genetic diversity, resilience, and persistence of bat populations	Negative High	Negative High
<b>Avifaunal</b>		
1. Mortality due to collisions with the wind turbines 2. Displacement due to disturbance during construction and operation of the wind farm 3. Displacement due to habitat change and loss at the wind farm 4. Mortality due to electrocution on the electrical infrastructure	Negative Medium	Negative Low
<b>Impacts to Socio-Economic Component</b>		
<b>Socio-economic</b>		
Vulnerability of small enterprises	Negative Medium	
Availability of community services	Negative Medium	
Cultural and historic resources	Negative Medium	
Land use	Negative Medium	
Livelihoods and ecosystem services	Negative Low	
Social and community infrastructure	Negative Low	
Annoyance, dust and noise	Negative Medium	

Impact	Pre-mitigation	Post-mitigation
Blade glint	Negative Medium	
Crime and security	Negative Medium	
Daily living patterns	Negative Low	
Electromagnetic field (EMFs)	Negative Low	
Employment after construction	Negative Medium	
Employment and business opportunities	Positive Medium	
Farming operations	Negative Medium	
Fire hazard	Negative Medium	
Hazard exposure	Negative Medium	
Shadow flicker	Negative Medium	
STDs, HIV and AIDS	Negative High	
Risk to livestock	Negative Medium	
Transformation of the sense of place	Negative Medium	
Corruption	Negative Medium	
Security of electricity supply	Positive High	
Temporary influx of construction workers	Negative Medium	
Informal development and settlements	Negative Medium	
<b>Heritage (Archaeology)</b>		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	Negative Medium	Negative Low
<b>Heritage (Palaeontology)</b>		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to clearance and bedrock excavations.	Negative Low	Negative Low
<b>Cultural Landscape</b>		
Inappropriate cumulative development degrade the significant ecological elements of the cultural landscape	Negative Very High	Negative Medium
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	Negative Very High	Negative Medium
Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	Negative Very High	Negative Medium
<b>Noise</b>		
Cumulative noises due to operating wind turbines from other wind energy facilities in the area	Negative Low	Negative Low
<b>Transport</b>		

Impact	Pre-mitigation	Post-mitigation
Increase in Traffic	Negative Medium	Negative Medium
Increase of Incidents with pedestrians and livestock	Negative Medium	Negative Medium
Increase in Dust from gravel roads	Negative Medium	Negative Low
Increase in Road Maintenance	Negative Low	Negative Low
Additional Abnormal Loads	Negative Medium	Negative Low
Increase in Dust from gravel roads	Negative Medium	Negative Low
New / Larger Access points	Negative Low	Negative Low
<b>Visual</b>		
<ul style="list-style-type: none"> <li>Additional renewable energy 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.</li> <li>Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.</li> <li>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.</li> <li>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.</li> </ul>	Negative Medium	Negative 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	<p>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.</p> <p>Three potential negative agricultural impacts were identified as follows: loss of agricultural land use, land degradation, and the impact of dust, but all are of low significance.</p> <p>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.</p>	<p>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.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved.</p> <p>The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than recommended mitigations provided.</p>
Avifaunal	<p>It is estimated that a total of 135 bird species could potentially occur in the broader area. Of these, 18 species are classified as priority species for wind development.</p> <p>The proposed Karee grid will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> <li>▪ Displacement of priority species due to disturbance linked to construction activities in the construction phase.</li> <li>▪ Displacement due to habitat transformation in the construction phase.</li> <li>▪ Collisions with the overhead line in the operational phase.</li> <li>▪ Displacement of priority species due to</li> </ul>	<p><u>High sensitivity: Line marking required</u></p> <ul style="list-style-type: none"> <li>▪ The PAOI contains confirmed habitat for species of conservation concern (SCC) as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). The occurrence of SCC was confirmed during the integrated pre-construction monitoring programme, with observations of Ludwig's Bustard, Southern Black Korhaan, Karoo Korhaan and Verreaux's Eagle recorded within the PAOI and its immediate surrounds. Based on the field surveys to date, a classification of High sensitivity for avifauna in the screening tool is therefore appropriate. The appropriate mitigation measure would be to mark</li> </ul>

Specialist Study	Findings	Recommendations
	disturbance linked to dismantling activities in the decommissioning phase.	the entire line with Bird Flight Diverters.
Biodiversity	<p>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.</p> <p>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 biodiversity even at great distance.</p> <p>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.</p>	<p>Based on the findings of this study, 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 systems could be avoided, while making use of existing tracks, however technical considerations have resulted in Substation Option 2 being selected. Further it is recommended that WTG 20 should be moved out of the Renosterveld / Fynbos area.</p> <p>However, this must still be considered once the roads layout has been provided, coupled to a micro-siting walkdown once this information is available.</p>
Geotechnical	<p>The assessment area is underlain by rock units of Dwyka Group and 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 transported (alluvium and scree) 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.</p> <p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective.</p>	<p>The proposed developments are assessed to have a "Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation" provided that the recommended mitigation measures are implemented.</p> <p>These include avoiding development on the steeper sections of the site. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practice.</p> <p>Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report.</p>
Heritage – Archaeological	<p>A total of two (2) structures were identified, including one farmstead and a one-roomed stone structure.</p> <p>The farmstead (Karee_10) was rated as having</p>	This report confirms that the impact of the new Karee WEF and associated grid connection infrastructure will be reduced with the implementation of the mitigation measures. This finding in addition to the



Specialist Study	Findings	Recommendations
	<p>medium heritage significance and the other structure (Karee_11) was rated as having low heritage significance.</p> <p>A total of fourteen (14) archaeological site were identified, including one (1) site with LSA flakes and OES, one (1) rock shelter with rock art and flakes, one (1) site with LSA flakes and the remains of a stone structure, one (1) site with a pebble deposit with various artefacts, one (1) site with ESA, MSA and LSA artefacts (incl. Fauresmith), one (1) site with LSA structures and deposit and eight (8) findspots.</p> <p>Two (2) archaeological sites (Karee_6, Karee_18) were rated as having high heritage significance, two (2) archaeological sites (Karee_12, Karee_15) were rated as having medium heritage significance and two (2) archaeological sites (Karee_2, Karee_8) were rated as having low heritage significance.</p> <p>Eight (8) findspots (Karee_1, Karee_3, Karee_4, Karee_9, Karee_14, Karee_16, Karee_17, Karee_19) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered.</p>	<p>implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources.</p> <p>An assessment of the final footprint of the new Karee WEF and associated grid connection infrastructure must be conducted with the final walkdown of the area during the implementation of the EMPr.</p> <p><b>The following mitigation measures will be required:</b></p> <ul style="list-style-type: none"> <li>▪ An archaeological walk down of the final approved layout will be required before construction commences;</li> <li>▪ Implement a 50-meter buffer around the structure at <b>Karee-11</b>.</li> <li>▪ Implement a 50-meter buffer around all archaeological site with a rating of IIIB and higher.</li> <li>▪ Implement a 500-meter buffer around the farmstead site at <b>Karee_10</b>.</li> <li>▪ Implement a 200-meter buffer around the rock art site at <b>Karee_6</b>.</li> <li>▪ Demarcate the resources rated as IIIC-IIIa no-go areas.</li> <li>▪ A management plan for the heritage resources needs then to be compiled and approved for implementation during construction and operations.</li> <li>▪ 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.</li> </ul>
Heritage Cultural	<p>– 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 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</p>	<p>The conclusion of this CLA study has culminated in the map (Figure 1 of the CLA Report) showing location of proposed turbines and WEF infrastructure with the following heritage indicators and development buffers:</p> <ul style="list-style-type: none"> <li>▪ Landscape unit C is suitable for sensitive WEF infrastructure development;</li> <li>▪ A 500m buffer to either side of the district road for turbine and other infrastructure placement (Karee WEF does not propose turbines within this buffer) – due to existing gridlines within this road buffer, proposed option 1 for new gridlines is acceptable in its placement;</li> <li>▪ 300m buffer to either side of identified significant historic farm roads for turbine placement,</li> </ul>

Specialist Study	Findings	Recommendations
	<p>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 Komsberg area, notably the proposed RE developments included in the cumulative impact section of this report.</p> <p>Conservation: to protect the natural resources (water, air, land, sand, fishes, etc.), ecosystems (reefs, fynbos), biological abundance (flora and fauna), landscapes and the local culture.</p> <p>Development: to protect social and economic progress, without damaging or depleting the natural resources (sustainable development).</p> <p>The findings of this report, coupled with the proposed layout for development of wind turbines, which considers appropriate placement in terms of wind energy capacity, concludes that the development can be permitted within the site if the report's recommendations are followed.</p> <p>The mitigating recommendations in this report consider the ecological, aesthetic, historic and socio-economic value lines that underpin the layers of significance that combine to create the character of the place and the cultural landscape of the Ceres Karoo. These recommendations include road and farmstead complex buffers which incorporate cultivated areas and graves, steep slope and ridgeline no-go areas as well as consideration of the unique land form of the site, CBA and ESA no-go areas, as well as mechanisms to support the non-landowner residents that live on the site in being bale to continue their indigenous land use patterns, knowledge and social systems. These mitigations will reduce the impact on the surrounding landscape and heritage resources but due to the high visual impact of the turbines, largely a result of their height, the negative impact to the cultural landscape cannot be removed, only reduced from very high to moderate.</p>	<p>substation and laydown areas;</p> <ul style="list-style-type: none"> <li>▪ 1000m buffer around historic farmsteads (red circles) for turbine placements; and</li> <li>▪ 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 and no WEF roads running through farmstead complexes;</li> <li>▪ 200m freestanding graded heritage structure buffer for new roads and infrastructure;</li> <li>▪ 100m buffer from cemetery or unmarked burial for all development;</li> <li>▪ 400m buffer around water management bio-cultural landscape elements (blue circles);</li> <li>▪ existing roads to be used with minimal upgrade as far as possible;</li> <li>▪ riverine corridors 100yr flood line buffer (ecological) or 100m buffer (archeological) whichever is further (buffers not indicated).</li> <li>▪ CBA and ESA no-go areas for all development (green shading – turbines 27 and 31), unless otherwise recommended by the biodiversity and environmental specialist studies for this site;</li> <li>▪ Should any development be proposed for the CBAs or river drainage lines, a survey for potential historic sites will need to be completed before such development commences;</li> <li>▪ Voetpadskloof gateway buffer included in the 300m farm road buffer and unit A.</li> <li>▪ Further, the following changes to the current proposed layout is recommended:</li> <li>▪ 20 current proposed turbine placements (red) have been found unsuitable for their negative impacts but could be accommodated in landscape unit D where appropriate;</li> <li>▪ Proposed substation sites should be relocated to slopes less than 3%;</li> <li>▪ Proposed gridlines should be accommodated outside of the 500m district road buffer as far as possible.</li> </ul>
Heritage – Paleontological	No palaeontological High Sensitivity or No-Go areas have been identified within the WEF, BESS 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	<p><b>Recommended mitigation:</b></p> <p>(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</p>

Specialist Study	Findings	Recommendations
	<p>mitigation is recommended for these developments.</p> <p>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 <i>positive</i> impact).</p> <p>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 <b>LOW</b> (<i>negative</i>) with and without mitigation. It is concluded that, as far as fossil heritage resources are concerned, the proposed Karee WEF, BESS 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 <i>provided that</i> 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.</p> <p>There are no fatal flaws in the Karee WEF, BESS and grid development proposals as far as fossil heritage is concerned. Provided that the recommended palaeontological monitoring and mitigation measures are followed through, residual impacts for the Karee WEF, BESS and grid projects are rated as <b>LOW</b>. There are no objections on palaeontological heritage grounds to authorization of the proposed Karee WEF and the associated grid connection.</p>	<p>development.</p> <p>(6) Monitoring for fossil material of all major surface clearance and deeper (&gt; 1m) excavations by the Environmental Site Officer on an on-going basis during the construction phase is therefore recommended.</p> <p>(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.</p> <p>(8) A protocol for Chance Fossil Finds is appended to this report (Appendix 3). These recommendations must be included within the Environmental Management Programmes (EMPrs) for the Karee WEF, BESS and grid connection developments.</p>
Social	<p>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 “[i]n all realistic mitigation scenarios, the majority of new build capacity is wind and solar PV”, 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.</p>	<p>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.</p>

Specialist Study	Findings	Recommendations
	<p>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.</p>	
Aquatic	<p>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 on aquatic resources, but requiring the clearing of areas with terrestrial vegetation, especially when considering the associated roads, cables and other infrastructure.</p> <p>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, to avoid 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.</p> <p>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. 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.</p>	<p>Based on the findings of this study, 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, however technical considerations have resulted in Substation Option 2 being selected is supported as Option 1 is located within a watercourse.</p> <p>However, this must all still be assessed once the roads layout has been provided, coupled to a micro-siting walkdown once all information is available.</p>
Transportation	<p>The traffic specialist doesn't foresee any major risks concerning the proposed development</p> <p>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</p>	<ul style="list-style-type: none"> <li>• A new access position on Road DR01475 is proposed @ Km 72.80.</li> <li>• All external road upgrades require approval and a wayleave application from the Western Cape Department of Transport &amp; Public Works prior to work commencing.</li> <li>• Mitigation measures to be included in the construction / BoP phase:</li> </ul>

Specialist Study	Findings	Recommendations
	<p>being completed in the immediate area.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>○ Ensure staff transport is done in the 'Off Peak' period and by bus to reduce impact in the peak periods;</li> <li>○ Stagger material, component and abnormal loads deliveries;</li> <li>○ Adequate road signage on all external roads carrying development traffic according to the South African Road Traffic Sign Manual (SARTSM);</li> <li>○ Reduction in speed of vehicles;</li> <li>○ Adequate enforcement of the law;</li> <li>○ Implementation of pedestrian safety initiatives;</li> <li>○ Regular maintenance of farm fences &amp; access cattle grids;</li> <li>○ Construction of gravel roads in terms of Technical Recommendations for Highways (TRH20);</li> <li>○ Implement a road maintenance program under the auspices of the respective transport department; and</li> <li>○ Possible use of an approved dust suppressant techniques.</li> </ul> <ul style="list-style-type: none"> <li>• A more comprehensive route analysis be completed prior to construction in order to get a better understanding of the works required and the potential risks.</li> <li>• The 'No Go' alternative would result in there being no transportation impacts.</li> <li>• No fatal flaws or preferences were identified for any of the proposed site alternatives, construction laydown areas, substation locations or Power line routes.</li> <li>• No environmentally sensitive areas have been identified and therefore no areas are to be avoided from a Transportation perspective.</li> </ul> <p>It is the traffic specialist opinion that the that the Karee Wind Energy Facility and associated grid infrastructure will have a nominal impact on the existing traffic network.</p> <p>The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures in this report are implemented, and hence the Environmental Authorisations (EAs) should be granted for the BA applications.</p>
Visual		

Specialist Study	Findings	Recommendations
	<p>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.</p> <p>Although the study area is not typically known for its tourism significance, the presence of several private nature and game reserves would suggest that the area does have some tourism appeal. There is however limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of thirty-three (33) potentially sensitive receptors were identified within the combined study area, although only nineteen (19) of these were found to be within the viewshed for the proposed WEF. Four (4) 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 Vaalkloof Private Nature Reserve. The remaining three (3) sensitive receptors would experience moderate levels of impact.</p> <p>Fifteen (15) 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 six (6) of these receptors are expected to experience high levels of visual impact as a result of the WEF development. This sensitivity rating relates largely to the fact that these receptors are located in in close proximity to the boundary of the Karee WEF application site and they are in zones of high contrast, with little natural screening present. Two of these receptors, namely VR22 and VR49 are in fact located within the proposed Karee WEF development area and as such, these properties form part of the WEF project. Thus it is assumed that the owners have a vested interest in the WEF project and would not perceive the development in a negative light. Furthermore, none of these receptors are tourism-related facilities and as such they are not considered</p>	<p>It is the specialist's opinion that the potential visual impacts associated with the proposed Karee WEF and associated 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.</p>

Specialist Study	Findings	Recommendations
	<p>to be Sensitive Receptors.</p> <p>Nine (9) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Karee WEF development.</p> <p>The only sensitive receptor (SR1) identified within 5km of the power line assessment corridors would experience only moderate levels of visual impact as a result of the proposed 132kV132kV power line associated with the Karee WEF development.</p> <p>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. Impacts resulting from the proposed new power line are however expected to be reduced by the presence of existing high voltage power lines already visible to these receptors. In addition, one of these receptors is VR22 which is located within the proposed WEF development area and as such, this property forms part of the WEF project. The remaining four (4) potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed power line.</p> <p>Although the N1 and R356 receptor roads traverse the study area, wind turbines are only expected to be visible from the R356. Motorists travelling along this route are only expected to experience moderate impacts from the proposed Karee WEF and no impacts from the grid connection infrastructure are associated with the project.</p> <p>An overall impact rating was also conducted in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed <b>Karee WEF and associated grid connection</b> infrastructure will be of <b>low significance</b> during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact. Visual impacts associated with the grid connection infrastructure during operation would be of low significance.</p>	

Specialist Study	Findings	Recommendations
	<p>Although other proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Karee WEF project, it was determined that only four (4) of these would have any significant impact on the landscape within the visual assessment zone, namely Perdekraal East WEF, Perdekraal West WEF, Tooverberg WEF and Patatskloof WEF. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.</p>	

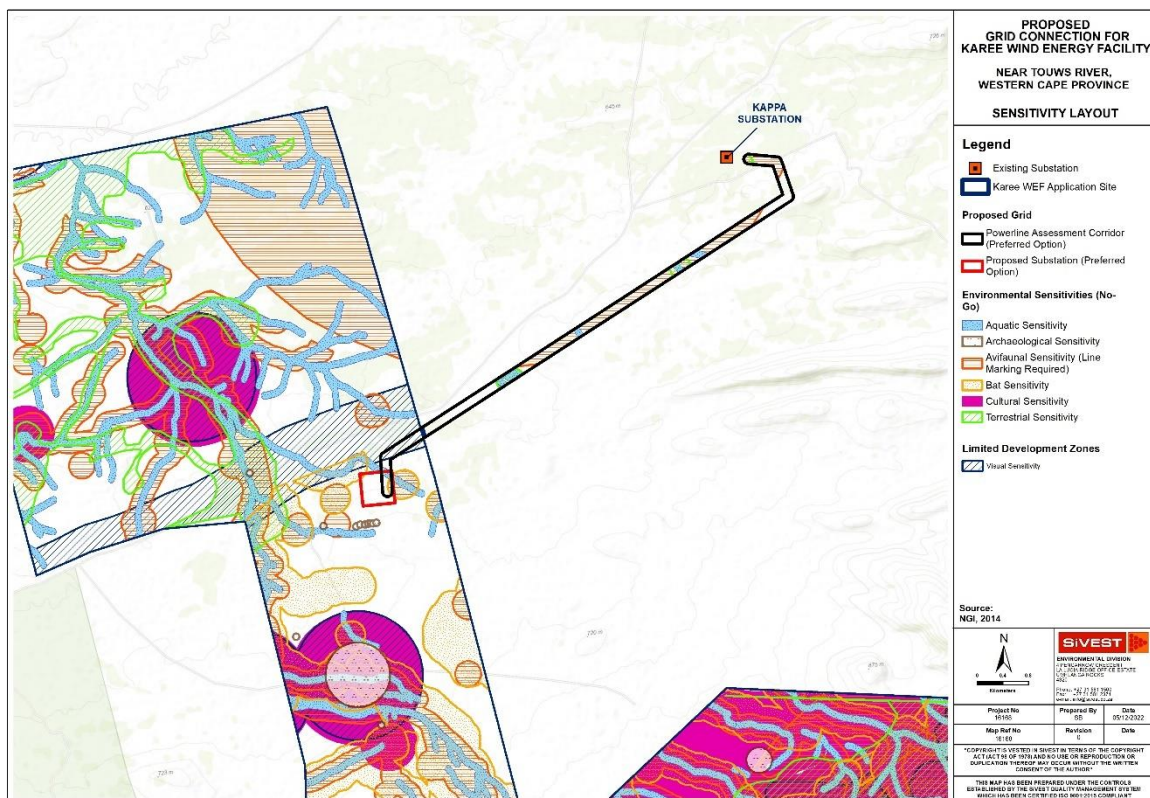


## 18. ENVIRONMENTAL IMPACT STATEMENT

South Africa Mainstream Renewable Power Developments (Pty) Ltd is proposing to construct grid connection infrastructure. The overall objective of the proposed development is to feed the electricity generated by the proposed Karee WEF into the national grid, which will be procured under either the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), other government run procurement programmes or potential private offtake entities. The proposed Karee grid will comprise of one (1) new 33/132kV on-site substation as well as one (1) new associated 132kV overhead power line for the proposed Karee Wind Energy Facility (WEF) (part of a separate Basic Assessment (BA) process).

Taking into consideration the findings of the BA process for the proposed development and the fact that specialist recommendations have been used to inform the project layout, it is the opinion of the Environmental Assessment Practitioner (EAP) that the majority of the negative impacts associated with the implementation of the proposed project can be mitigated to acceptable levels. While there are potential negative environmental impacts associated with the proposed development, the extent of the positive benefits associated with the implementation of the project in terms of renewable energy supply and positive local and regional economic impact are considered to outweigh the negative impacts.

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



**Figure 29: Final proposed route alignment with site sensitivities**

The implementation of the Karee 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.

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).

The following specialist studies have been undertaken for the project:

- Agriculture and Soils Impact Assessment (desktop)
- Avifaunal Impact Assessment
- Biodiversity Impact Assessment
- Heritage Impact Assessment
  - Paleontological Impact Assessment
  - Archaeological Assessment
  - Cultural Landscape Assessment
- Geotechnical Assessment (desktop)
- 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 Karee grid development will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The alternative substation and laydown locations are all situated in essentially the same habitat, i.e., Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. No fatal flaws were discovered in the course of the onsite investigations. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

The **aquatic assessment and terrestrial assessment** (refer to **Appendix 6**) revealed that there is no reason to withhold an authorisation of any of the proposed activities, assuming that key mitigations measures are implemented. The specialist has no preference with regard to 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, however technical considerations have resulted in Substation Option 2 being selected is supported as Option 1 is located within a watercourse.

According to the **geotechnical assessment** undertaken for the project (refer **Appendix 6**), no fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective. However further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report. The impact of the WEF was found to be negative low impact as the anticipated impact will have negligible negative effects and will require little to no mitigation provided that the recommended mitigation measures are implemented. The site from a desktop level geotechnical study perspective is considered suitable for the proposed WEF and the specialist therefore recommended that the proposed activity be authorised.

According to the **archaeological impact assessment** (refer to **Appendix 6**), the overall impact of the Karee grid project, 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**) recommended that the substation and gridline locations require some layout alteration to accommodate slope topography, historic district road and view shed to Tooverberg and Pramberg. With these buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Karee 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 Karee grid connection developments are 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.

According to the **transportation assessment** (refer to **Appendix 6**), the Karee Wind Energy Facility and associated 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 Karee WEF and associated 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. SiVEST 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.

Based on the findings of the specialists, the potential impacts identified, the route alignment has been updated to avoid environmental sensitivities where possible to produce a draft layout. No further layout alternatives have been considered as part of the BA process. Impact assessments have been undertaken on the revised layout. No technology alternatives will be considered.

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

It is trusted that the DBAR provides adequate information to the I&APs / stakeholders to provide input and for the competent authority to make an informed decision regarding the proposed development.

It should be noted that this section is deemed to be in line with the requirements of Appendix 1 of the EIA Regulations 2014, as amended, and contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers (**Figure 29**) and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

## **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 EMPr 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 EMPr 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 EMPr (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 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;
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The final layout should be submitted to the Competent Authority (namely the DFFE) for approval prior to commencing with the activity.
- The activity-specific construction EMPr must be adhered to.
- 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.

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 also been prepared accordingly (**Appendix 8**).

## 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 KAREE GRID PROJECT

The final route alignment for the Karee 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 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 development of the 132kv portion / yard of the 33kv/132kv portion of the shared on-site substation and associated 132kv power line for the proposed Karee WEF 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 BA phase, however the report provides an outline of the established measures that were taken to best identify all the potential impacts.

No fatal flaws were identified during the BA Process. In conclusion, SiVEST, as the independent EAP, is therefore of the view that:

- The site location and project description can be authorised based on the findings of the suite of specialist assessments.
- A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on their findings, majority of the cumulative impacts associated with the proposed development can be kept either low or medium after the implementation of mitigation measures. In addition, the social specialist found that the project will result in several positive cumulative effects on the socio-economic environment and that these cumulative impacts will be positive medium, before and after the implementation of mitigation measures; and
- Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed Environmental Control Officer (ECO) as well as the competent authority, the potential detrimental negative impacts associated with the proposed development can be mitigated to acceptable levels.

## 26. WAY FORWARD

The Draft Basic Assessment Report is currently being circulated for public participation for a period of 30 days (excluding the period of **15 December 2022** to **5 January 2023**) from **05 December 2022** until **26 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](mailto:sivest_ppp@sivest.com)  
 📠 Fax: (011) 803 7272  
 Website: [www.sivest.com](http://www.sivest.com)

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







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