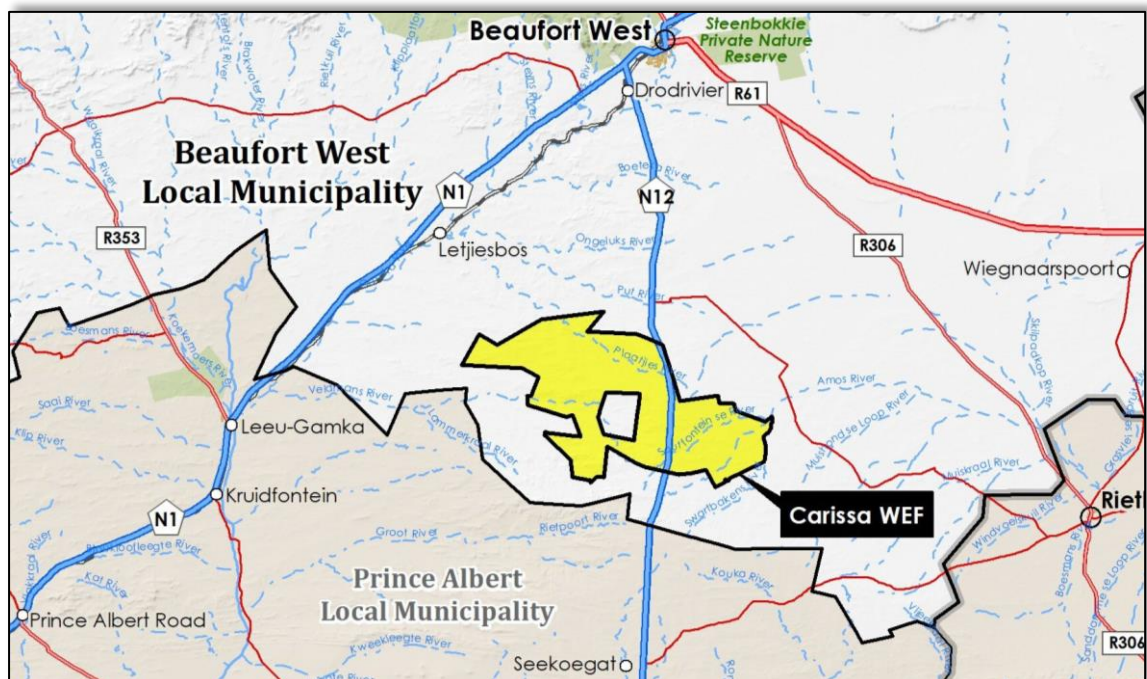


Carissa Wind Energy Facility

Application for :

- Consent Use : Renewable Energy Structures
- Departure : Building Lines & Height

on various farm portions south of Beaufort West



Report Number : 1896E

January 2025

Prepared by :

Johan van der Westhuysen



117 Cape Road, Mill Park, Gqeberha, 6001
Tel: 083 321 2299 - Email: info@udec.co.za


Prepared for :

AMDA Oscar (Pty) Ltd



302E Sunclare, 21 Dreyer Street, Claremont, Cape Town
PO Box 2681, Cape Town, 8000

Report Title :	Carissa Wind Energy Facility Application for : <ul style="list-style-type: none"> • Consent Use: Renewable Energy Structures • Departure : Building Lines & Height on various farm portions south of Beaufort West
Report Number :	1896E
Report Date :	01.2025
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Prepared By :	Johan van der Westhuysen
SACPLAN Registration :	A/923/1996 (Pr. Plan)
Contact Number :	083 321 2299
Email Address :	info@udec.co.za johan@udec.co.za
Signed :	

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7. Cadastral Diagrams
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9. Agricultural Agro-Ecosystem Specialist Assessment (10.2024)
10. Land Claims Commissioner (LCC) Confirmation

Note : All Specialist Studies can be made available on request

1. The Applicant

Urban Dynamics Eastern Cape (UDEEC) has been commissioned by AMDA Oscar (Pty) Ltd, on behalf of the owners of various farm portions, south of Beaufort West (Western Cape, Beaufort West Municipality), to prepare and submit an application to obtain the necessary development rights to develop a wind farm for the generation of renewable energy, known as the Carissa Wind Energy Facility (WEF).

Refer to Map 1 : Regional Locality

Refer to Annexure 2 : Powers of Attorney

Urban Dynamics EC forms part of a professional consultant team that conducted various specialist studies, supplied supporting documentation and undertook detailed site analysis and design. The detailed professional work done will enable the Municipality to take an informed decision and grant the required development rights to implement this WEF project.

2. The Project & Location

AMDA Oscar (Pty) Ltd plans to develop, construct and operate a Wind Energy Facility (WEF) 31 km south of Beaufort West and 57 km north-east of Prince Albert in the Western Cape Province, known as the Carissa Wind Energy Facility. Access to the Carissa WEF will be from existing minor roads, which turns off from the N12, between Beaufort West and Oudtshoorn. The project site is situated in the Beaufort West Local Municipality (LM) which forms part of the Central Karoo District Municipality (DM) in the Western Cape.

The proposed Carissa Wind Energy Facility will include up to 154 wind turbines and the following support infrastructure :

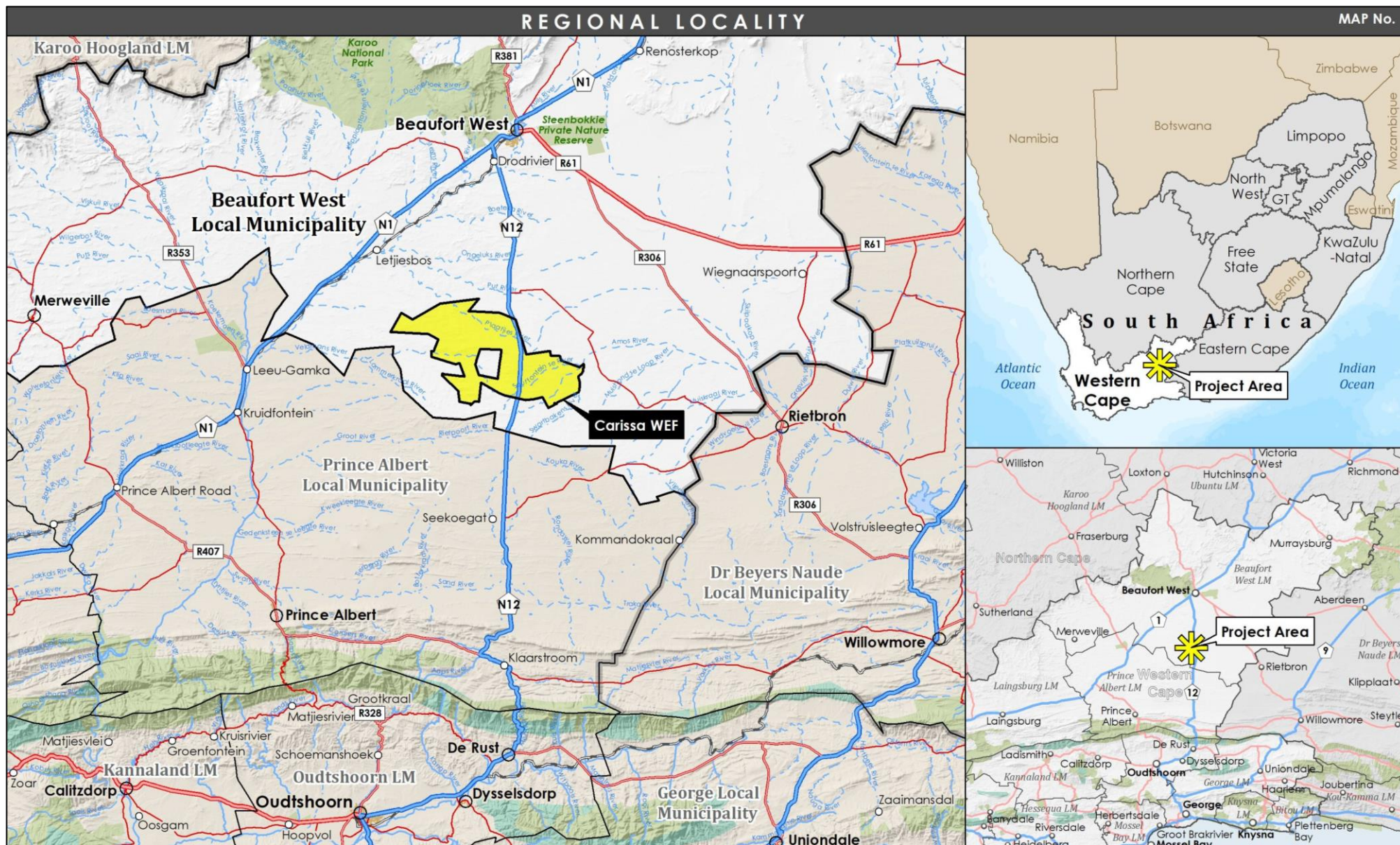
- Substation Complex (East) : 25 ha footprint including :
 - On-Site Substation including, Eskom Switching stations (9 ha)
 - Battery Energy Storage System (BESS) (5ha)
 - Operation & Maintenance Areas (1 ha)
- Substation Complex (West) : 25 ha footprint including :
 - On-Site Substation including, Eskom Switching stations (9 ha)
 - Battery Energy Storage System (BESS) (5ha)
 - Operation & Maintenance Areas (1 ha)
- Material Handling Areas (4 x 2 ha)
- Temporary Batching Plants (8 x 5 ha)
- Temporary Laydown Areas (4 sites, total 67 ha)
- Temporary Construction Site Camps (2 x 4 ha)
- Access Control Security Buildings (3 x 1 ha)
- Eskom Substation Servitude (36 ha)
- Access Roads and Power Lines
- Grid Connection Power Lines

The project has an estimated generation capacity of up to 1 000 MW.

Project detail and scale are outlined in detail under Paragraph 4.3 of this report.

Refer to Map 1 : Regional Locality

Refer to Map 2 : Property Descriptions & Cadastral Information



3. Affected Properties

Refer to Map 2 : Property Descriptions & Cadastral Information

Table 1 lists the relevant properties, ownership, title deed number, area, restrictive title conditions and registered bonds.

Property Description	Owner	Title Deed No.	Area (ha)	Restrictive Conditions	Bonds
Portion 6 Louis Rust (a portion of Portion 2) of Farm Dale Ajalon No. 322	Francois Jordaan Trust	T69555/2015	3901.0450	No	No
Portion 3 (Nieuwefontein) (portion of Portion 2) of Farm Vlakfontein No. 325	Nuwefontein Family Trust	T29164/2016	1676.6842	No	No
Farm Meyers Poort No. 326	Bantry Woods Inv 11 Pty Ltd	T23966/2003	6760.6071	No	Yes
Portion 3 (Jagers Kraal Zuid) of Farm Jagers Kraal No. 327	Sonop Trust	T15037/2002	2539.6174	No	No
Portion 6 of Farm Jagers Kraal No. 327	Jagerskraal Trust	T15038/2002	2489.5605	No	No
Remainder Farm Vetkoe Kraal No. 369	Eck Jacob Jacobus Van-Trustees	T25158/1992 T97247/2007	2148.7348	No	No
Portion 2 (Bothadale) of Farm Vetkoe Kraal No. 369	Johan Matthys Brits Lynette Brits	T4862/1992	2148.7505	No	No
Portion 3 of Farm Vetkoe Kraal No. 369 (Erf A of Farm Good Hope)	Jacob Jacobus Van Eck - Trustees	T21542/1971 T97244/2007	1713.0826	No	No
Remainder Farm Palmietfontein No. 370	Ou Kraal Familie Trust	T28867/2016	1629.3023	No	No
Portion 2 (Annex Nuwe Plant) of Farm Palmietfontein No. 370	Jacob Jacobus Van Eck - Trustees	T45650/1996 T97248/2007	664.6688	No	No
Remainder Portion 1 (Riet Fontein) of Farm Brits Eigendom No. 374	Amosvlei Trust	T94038/2002	737.2012	No	No
Remainder Portion 2 (Amandel Hoogte) of Farm Brits Eigendom No. 374	Johan Matthys Brits	T28910/1985	3628.4152	No	No
Remainder Portion 8 Amos Skuur (a portion of Portion 1) of Farm Brits Eigendom No. 374	Amosvlei Trust	T94038/2002	1199.2254	No	No
Portion 12 (a portion of Portion 8) of Farm Brits Eigendom No. 374	Amosvlei Trust	T94038/2002	1017.5608	No	No
Portion 14 (a portion of Portion 1) of Farm Brits Eigendom No. 374	Amosvlei Trust	T94038/2002	737.1360	No	No
Remainder Portion 16 (a portion of Portion 7) of Farm Brits Eigendom No. 374	Amosvlei Trust	T94038/2002	1214.5943	No	No
Portion 19 (Nuwe Plant) (portion of Portion 2) of Farm Brits Eigendom No. 374	Jacob Jacobus Van Eck - Trustees	T45650/1996 T97248/2007	2765.6490	No	No
Portion 20 (Libertyn) (portion of Portion 2) of Farm Brits Eigendom No. 374	Gerhardus Johannes Tredoux	T43502/2021	649.3555	No	No
Remainder Farm Kaffirs Kraal No. 380	Jacob Jacobus Van Eck - Trustees	T221/2003 T97249/2007	1225.1051	No	No
Portion 6 (Welgevonden) of Farm Kaffirs Kraal No. 380	Jacob Jacobus Van Eck - Trustees	T9135/1985 T97246/2007	1225.1063	No	No

Table 1 : Properties to Accommodate the Carissa WEF

Bonds are registered against the deeds of the following property :

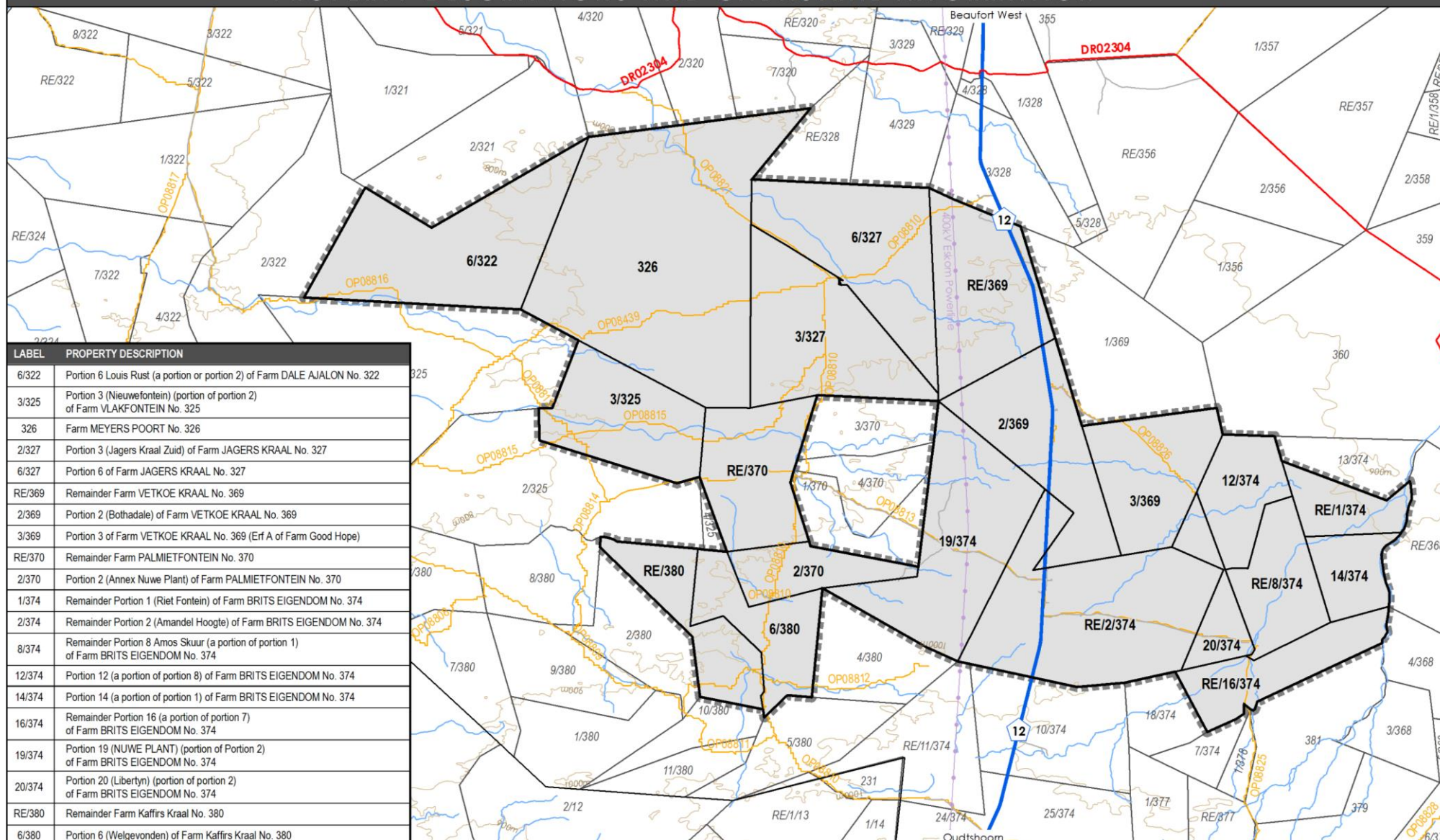
Property Description	Title Deed No.	Bond No.
Farm Meyers Poort No. 326	T23966/2003	B27743/2003

Refer to Annexure 3 : Deeds Office Enquiries

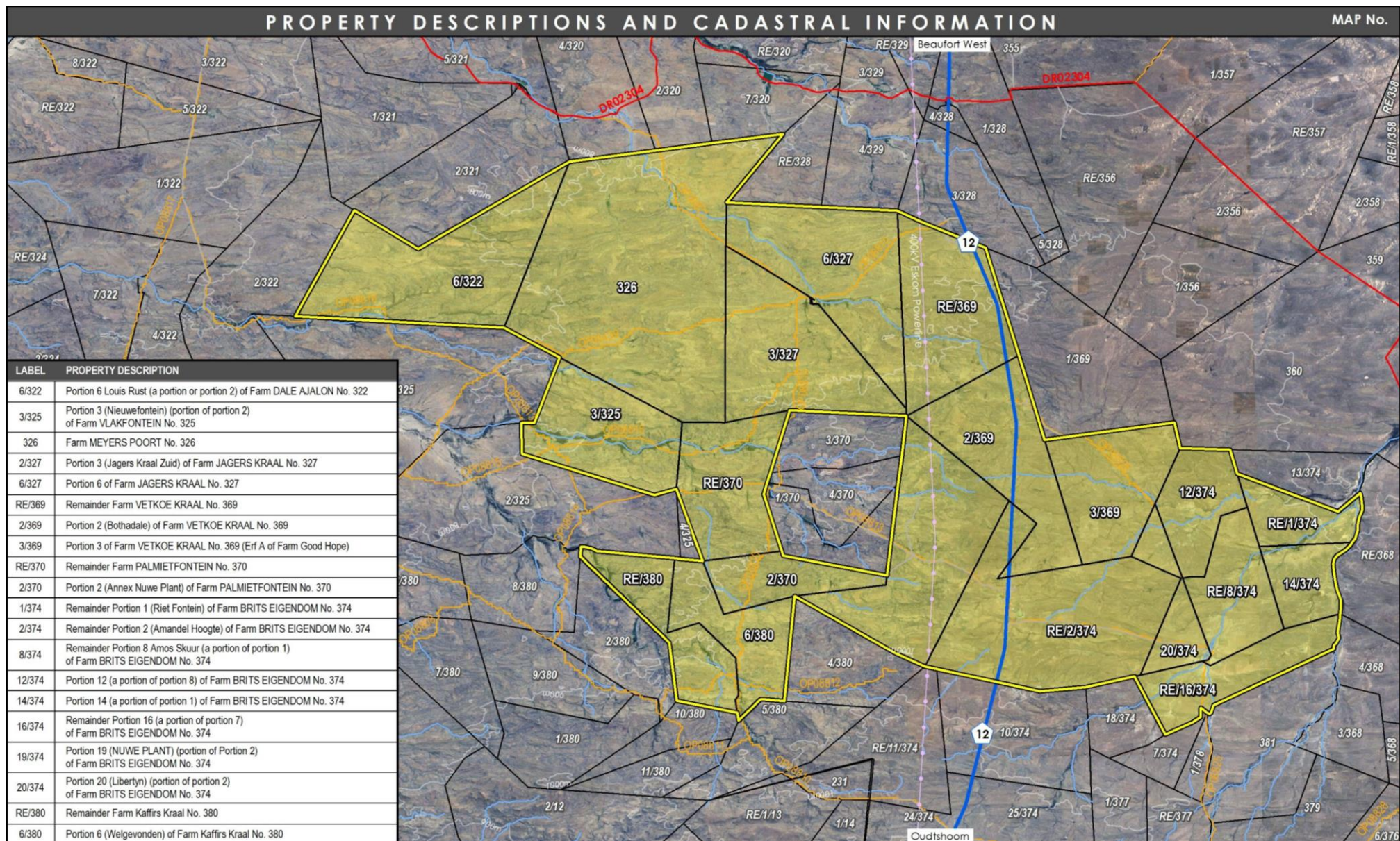
Refer to Annexure 4 : Title Deeds

Refer to Annexure 5 : Conveyancing Certificates

MAP No.



Map 2 : Property Descriptions & Cadastral Information



Map 2 : Property Descriptions & Cadastral Information

4. The Application

4.1 Objective

The objective of this application is to obtain the necessary development rights in terms of the Beaufort West By-law on Municipal Land Use Planning (2019) from the Beaufort West Municipality to implement, construct, operate and maintain a wind energy facility and associated infrastructure on the subject land portions.

The location of the WEF site has been identified through a detailed wind data capturing and assessment process, which indicates that the site has a favourable wind regime. The layout and siting of wind turbines was refined through an iterative process with input from various environmental and technical specialists as part of the design and Environmental Impact Assessment processes.

4.2 Legislation

Land use rights within the Beaufort West Municipality are managed through the :

- Spatial Planning & Land Use Management Act, 2013 (Act 16 of 2013) (SPLUMA)
- Western Cape Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)
- By-law on Municipal Land Use Planning for Beaufort West Municipality (2019)
- Beaufort West Standard Zoning Scheme By-Law (2020)

The relevant legislation, as indicated above, outlines the application procedures and processes, basis for decision making and various administrative arrangements through the application cycle, i.e. pre-application consultation, application, public participation, Authorised Official (AO) and Municipal Planning Tribunal (MPT) decision making and conditions of implementation.

In order to construct, operate and maintain the Carissa Wind Energy Facility, development approval is required for the following :

▣ **Consent Use : Renewable Energy Structure**

A wind energy facility, by its nature and location in the rural area, functions in harmony with the surrounding agriculture land uses. The agricultural and renewable energy facilities are therefore compatible land uses, in support of each other.

Land use rights within the Beaufort West Municipal area are managed by the By-law on Municipal Land Use Planning for Beaufort West Municipality and the Beaufort West Standard Zoning Scheme By-Law.

The Beaufort West Standard Zoning Scheme By-Law makes provision for "**Renewable Energy Structures**", as a consent use, on agriculture land and is defined as :

*"**Renewable Energy Structures** any wind turbine, solar energy generating apparatus, including solar photo-voltaic and concentrated solar thermal, hydro turbines or bio mass facility or any grouping thereof, that captures and converts wind, solar radiation or bio mass into energy for commercial gain; and includes any appurtenant structure necessary for, or directly associated with, generation of renewable energy, or any test facility or structure that may lead to the generation of energy on a commercial basis, excluding electrical grid connections".*

“Appurtenant structures” means :

- All appurtenant structures to a renewable energy structure prescribed by the Municipality concerning bulk, height, yard sizes, building lines, open space, parking and building coverage requirements are subject to applicable by-laws.
- Appurtenant structures, including equipment shelters, storage facilities, transformers and sub-stations must be architecturally compatible with the receiving environment as required by the Municipality, and contained within a renewable energy structure site development plan submitted for approval by the Municipality.
- Appurtenant structures may only be used for the storage of equipment or other uses directly related to the operation of the particular facility that they are associated with.
- Appurtenant structures must be screened from view by indigenous vegetation or be joined and clustered to minimise adverse visual impacts.

The Beaufort West Standard Zoning Scheme By-Law further outlines development parameters for renewable energy projects :

- **Height :**
 - Renewable Energy Structure : Technology dependant
 - Buildings : may not exceed 8.5 m
- **Setback (wind turbines) :**
 - 1.5 times the overall blade tip height of the turbine, from the nearest residential, commercial or critical agricultural structures
 - 100 m from the cadastral boundary of the land unit, unless the renewable energy structure straddles two or more cadastral boundaries, in which case no setback applies
 - 100 m from any public road or private or public right of way
 - 100 m from any electrical infrastructure
 - 1 000 m from towns, settlements or urban areas
- **Building Line for Agricultural Zone 1 (appurtenant structures) :**
 - 30 m

The Carissa WEF will include the following appurtenant structures : On-Site Substation and Eskom Switching stations, Battery Energy Storage System (BESS), Operation & Maintenance Areas, Temporary Batching Plants, Material Handling Areas, Temporary Laydown Areas, Temporary Construction Site Camps, Access Control Security Buildings and Eskom Substation.

▣ **Departure : Building Line and Height**

The Beaufort West Standard Zoning Scheme By-Law contains height restrictions of 8.5 m for buildings in a Renewable Energy Facility and a building line of 30 m from the cadastral boundary on agricultural zone 1 land for appurtenant structures.

The design for the appurtenant structures is up to 12 m high. There are some appurtenant structures that are situated within the 30 m building line, therefore the Departure application for the Buildings lines as indicated on Map 3 :Site Plan (1896E- SDP dated 01/2025) and height departure from 8.5 m to 12 m for all appurtenant structures.

■ **Approval of Final Site Plan**

A Site Plan (1896E-SDP dated 01/2025) including Inset 1, 2 & 3 is included in this application and should be endorsed by the Municipality as part of the application approval.

However, given the unique nature of WEF and the requirements of the relevant environmental guidelines, Environmental Authorisations, final IPP agreements and Government Department comment, final micro-siting and placement of turbines, roads, appurtenant structures and servitudes can only be finalised once all relevant approvals have been received and technical design requirements finalised. It is anticipated that minor amendments will be made to the Site Plan. As indicated and as part of this application, the final Site Plan will be submitted to the Municipality for endorsement prior to commencement of construction.

Refer to Map 3 : Site Plan (1896E-SDP dated 01/2025)

Refer to Map 3.1 : Site Plan : Inset 1 (1896E-IN1 dated 01/2025)

Refer to Map 3.2 : Site Plan : Inset 2 (1896E-IN2 dated 01/2025)

Refer to Map 3.3 : Site Plan : Inset 3 (1896E-IN3 dated 01/2025)

4.3 Application

Application is submitted for the following :

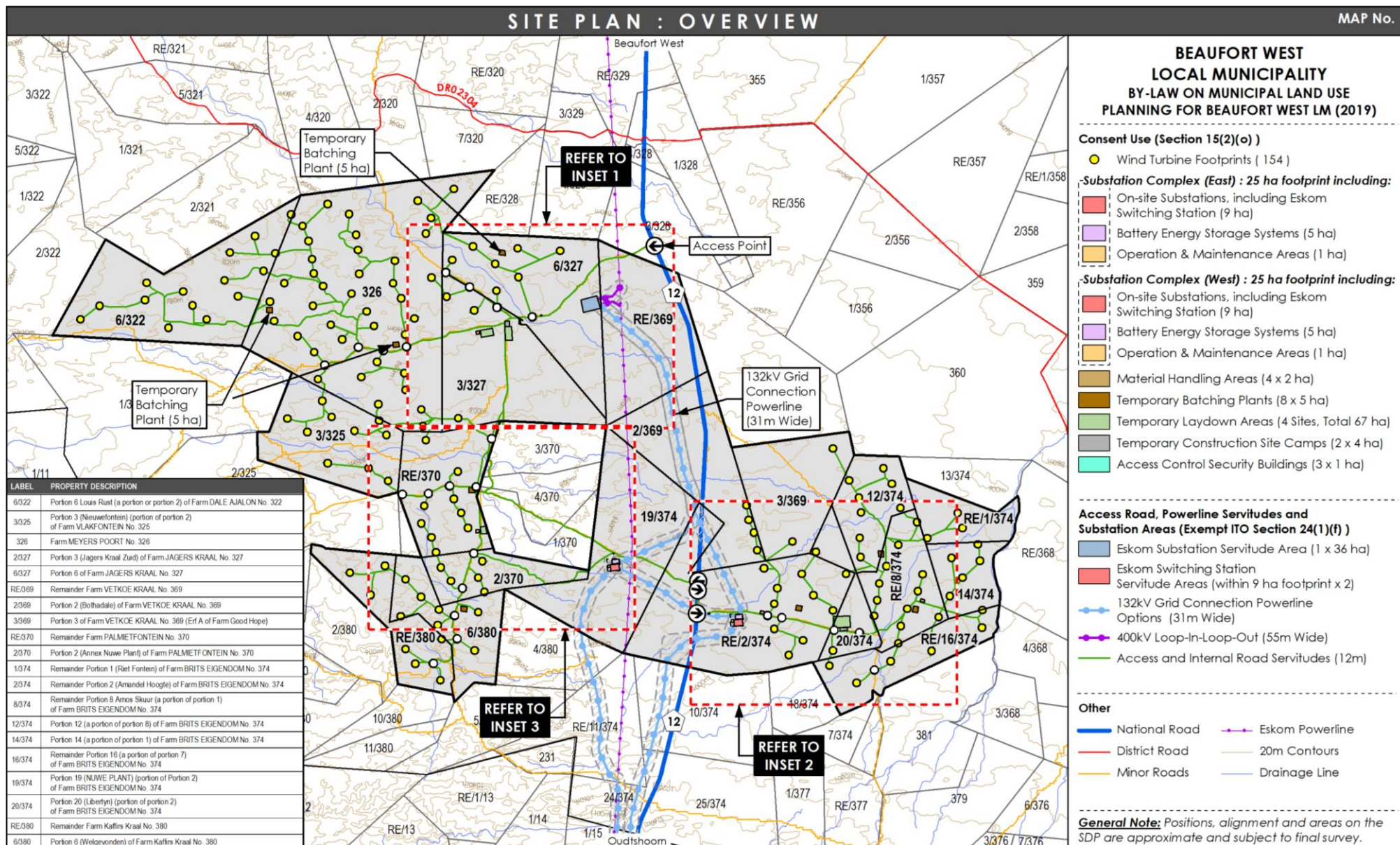
1. **Consent Use (Permanent) : Renewable Energy Structure** (including appurtenant structures), in terms of Section 15 (2) (o) of the Beaufort West Land Use Planning By-laws (2019), for 154 Turbine Footprints, On-Site Substations, Eskom Switching stations, Battery Energy Storage System (BESS), Operation & Maintenance Areas, Temporary Batching Plants, Material Handling Areas, Temporary Laydown Areas, Temporary Construction Site Camps, Access Control Security Buildings and Eskom Substation, on the following properties, as indicated on the Site Plan (1896E – SDP dated 01/2025) and the Development Parameters, as indicated in Table 2 below :
 - Portion 6 Louis Rust (a portion of portion 2) of Farm DALE AJALON No. 322
 - Portion 3 (Nieuwefontein) (portion of portion 2) of Farm VLAKFONTEIN No. 325
 - Farm MEYERS POORT No. 326
 - Portion 3 (Jagers Kraal Zuid) of Farm JAGERS KRAAL No. 327
 - Portion 6 of Farm JAGERS KRAAL No. 327
 - Remainder Farm VETKOE KRAAL No. 369
 - Portion 2 (Bothadale) of Farm VETKOE KRAAL No. 369
 - Portion 3 of Farm VETKOE KRAAL No. 369 (Erf A of Farm Good Hope)
 - Remainder Farm PALMIETFONTEIN No. 370
 - Portion 2 (Annex Nuwe Plant) of Farm PALMIETFONTEIN No. 370
 - Remainder Portion 1 (Riet Fontein) of Farm BRITS EIGENDOM No. 374
 - Remainder Portion 2 (Amandel Hoogte) of Farm BRITS EIGENDOM No. 374
 - Remainder Portion 8 Amos Skuur (a portion of portion 1) of Farm BRITS EIGENDOM No. 374
 - Portion 12 (a portion of portion 8) of Farm BRITS EIGENDOM No. 374
 - Portion 14 (a portion of portion 1) of Farm BRITS EIGENDOM No. 374
 - Remainder Portion 16 (a portion of portion 7) of Farm BRITS EIGENDOM No. 374
 - Portion 19 (NUWE PLANT) (portion of Portion 2) of Farm BRITS EIGENDOM No. 374
 - Portion 20 (Libertyn) (portion of portion 2) of Farm BRITS EIGENDOM No. 374
 - Remainder Farm Kaffirs Kraal No. 380
 - Portion 6 (Welgevonden) of Farm Kaffirs Kraal No. 380
2. **Permanent Departure**, in terms of Section 15 (2) (b) of the Beaufort West Land Use Planning By-Law, of the Building Lines as indicated in the Site Plan (1896 –SDP dated 01/2025) and of height to 12 m, as indicated in Table 2 below.
3. **Approval of Site Plan** (Map 3 : 1896E –SDP dated 01/2025)

Development Parameters

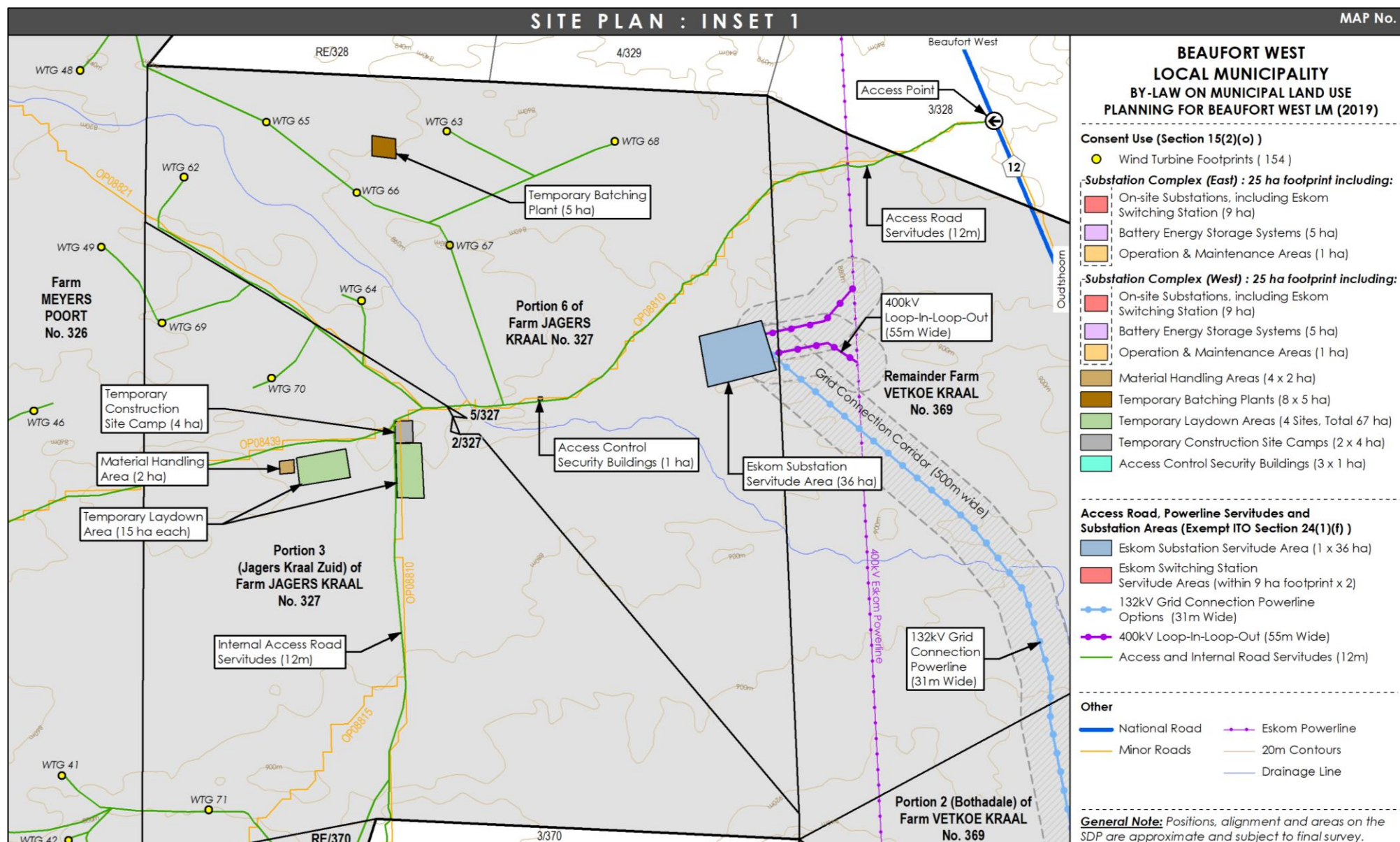
Zoning	Agricultural Zone 1
Primary Use	Agriculture
Consent Use	Renewable Energy Structure
Definitions	<p>Renewable Energy Structure means (a) any wind turbine, solar energy generating apparatus, including solar photo-voltaic and concentrated solar thermal, hydro turbines or bio mass facility or any grouping thereof, that captures and converts wind, solar radiation or bio mass into energy for commercial gain; and (b) includes any appurtenant structure necessary for, or directly associated with, generation of renewable energy, or any test facility or structure that may lead to the generation of energy on a commercial basis, excluding electrical grid connections</p> <p>Appurtenant Structures means (a) Equipment shelters, storage facilities, transformers and sub-stations must be architecturally compatible with the receiving environment as required by the Municipality, and contained within a renewable energy structure site development plan submitted for approval by the Municipality; (b) Appurtenant structures may only be used for the storage of equipment or other uses directly related to the operation of the particular facility that they are associated with</p>
Total Farm Area	± 41 000 ha
Turbines	Up to 154
Export Capacity	Up to 1 000 MW
Wind Turbine Specifications	<ul style="list-style-type: none"> • Rotor diameter : up to 200 m • Hub height : up to 180 m • Blade length : up to 100 m • Blade tip height : up to 280 m
Supporting Infrastructure (appurtenant structures): (Approximately 212ha)	<ul style="list-style-type: none"> • Substation Complex (East) : 25 ha footprint including : <ul style="list-style-type: none"> - On-Site Substation including, Eskom Switching stations (9 ha) - Battery Energy Storage System (BESS) (5ha) - Operation & Maintenance Areas (1 ha) • Substation Complex (West) : 25 ha footprint including : <ul style="list-style-type: none"> - On-Site Substation including, Eskom Switching stations (9 ha) - Battery Energy Storage System (BESS) (5ha) - Operation & Maintenance Areas (1 ha) • Material Handling Areas (4 x 2 ha) • Temporary Batching Plants (8 x 5 ha) • Temporary Laydown Areas (4 sites, total 67 ha) • Temporary Construction Site Camps (2 x 4 ha) • Access Control Security Buildings (3 x 1 ha) • Eskom Substation Servitude (36 ha)
Height	<ul style="list-style-type: none"> • Turbines : Up to 280 m • Appurtenant Structures : up to 12 m
Setbacks (Wind Turbines)	<ul style="list-style-type: none"> • 1.5 times the overall blade tip height of the turbine, from the nearest residential, commercial or critical agricultural structures • 100 m from the cadastral boundary of the land unit, unless the renewable energy structure straddles two or more cadastral boundaries, in which case no setback applies • 100 m from any public road or private or public right of way • 100 m from any electrical infrastructure • 1 000 m from towns, settlements or urban areas
Site Access	Access to the Carissa WEF will be from Minor Roads off the N12 Between Beaufort West and Oudtshoorn as indicated on the Site Plan (Map 3 : Site Plan (1896E-SDP dated 01/2025))
Servitudes	<ul style="list-style-type: none"> • Internal Roads and Internal Powerlines (Exempt in terms of Section 24 (1) (f) of the Beaufort West Land Use Planning By-Law
Grid Connection	<ul style="list-style-type: none"> • Two Grid Connection options to the Galenia MTS, ± 12 km south of Carissa WEF • 31 m wide 132 kV Grid Connection Powerlines to the on-site Eskom Substation Area • 55m wide 400kV Loop-In-Loop-Out Grid Connection Powerlines. • Final alignment subject to EIA process

Table 2 : Development Parameters

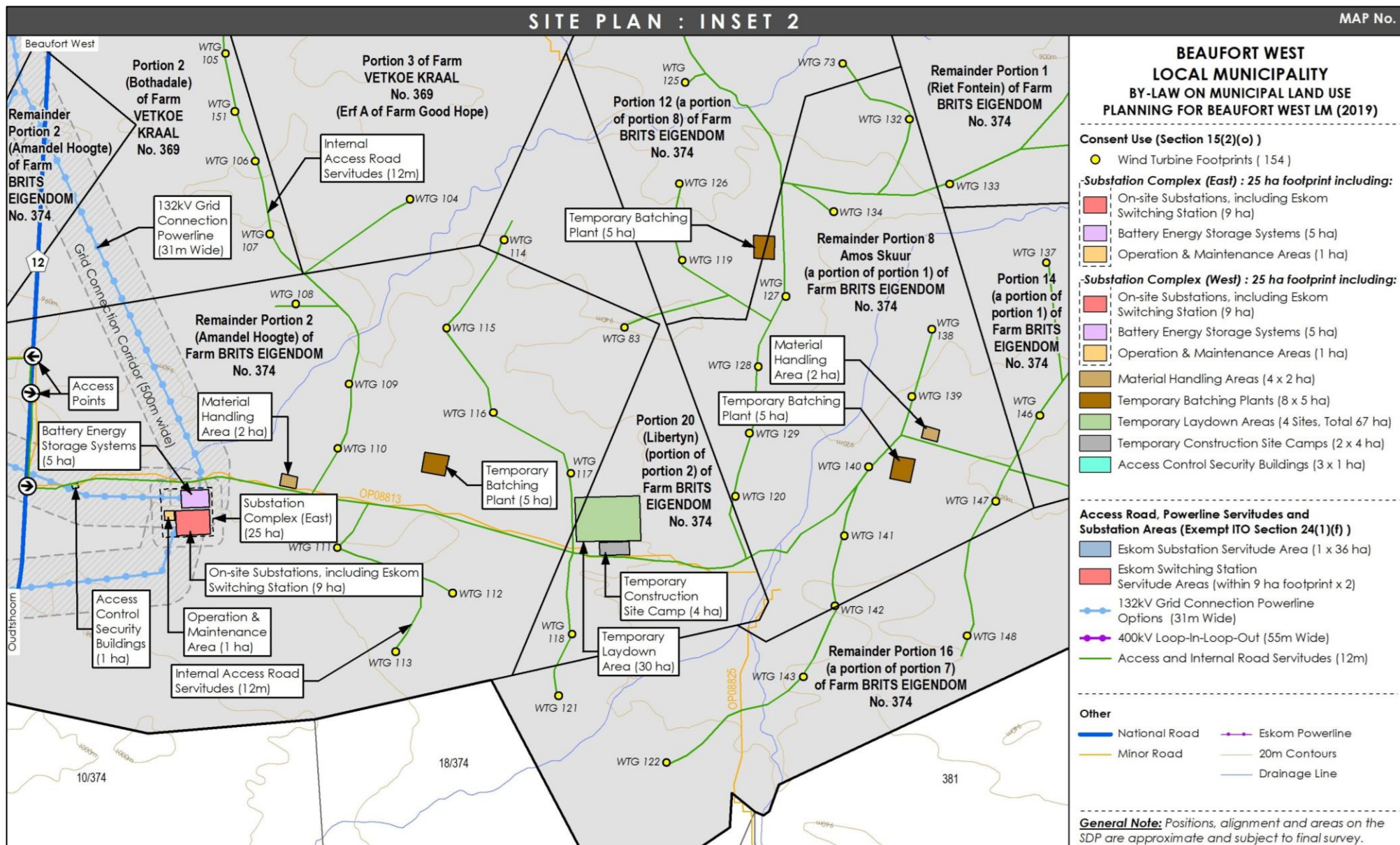
Refer to Map 3 : Site Plan (1896E-SDP dated 01/2025)



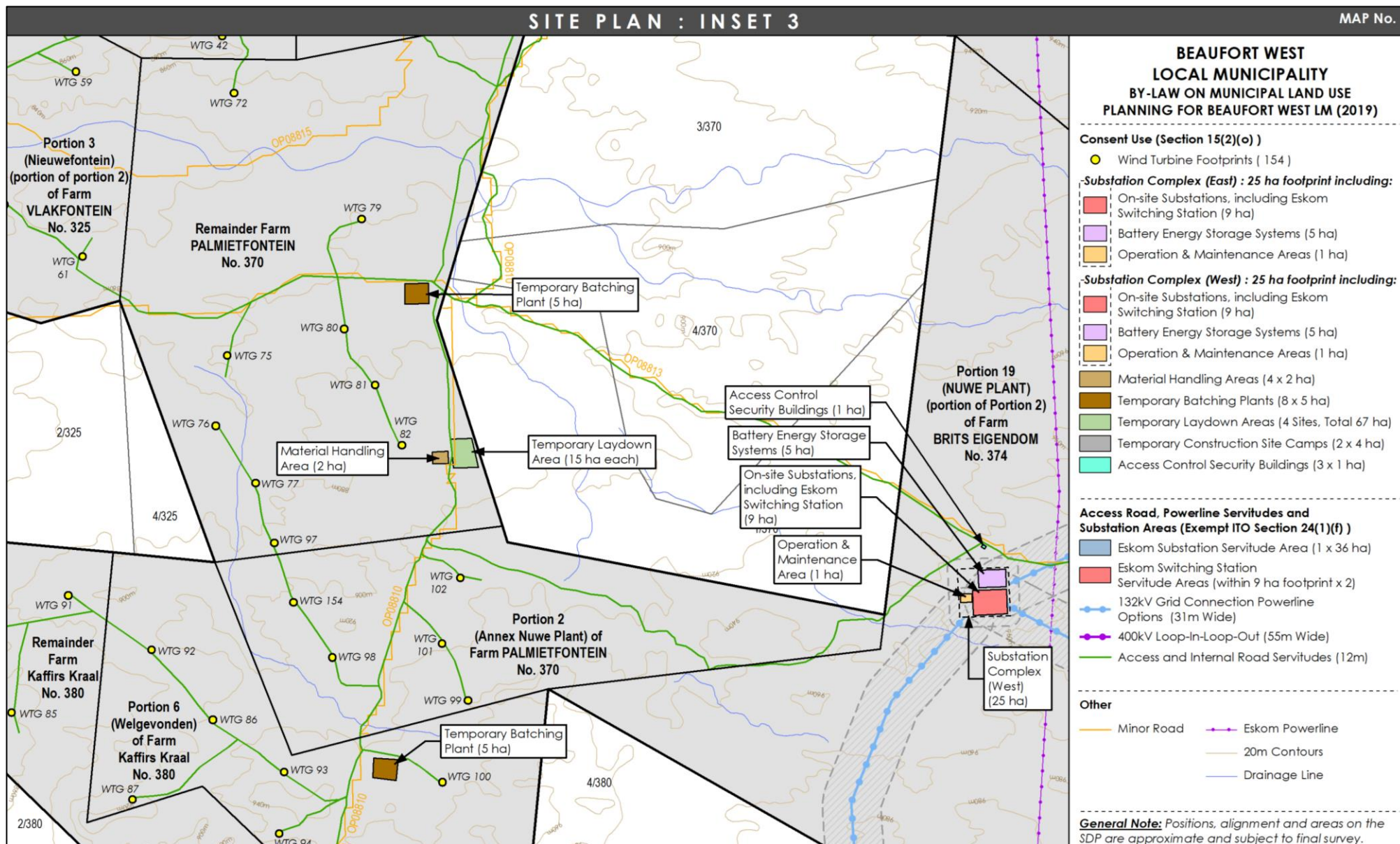
Map 3 : Site Plan : Overview



Map 3.1 : Site Plan : Inset 1



Map 3.2 : Site Plan : Inset 2



Map 3.3 : Site Plan : Inset 3

5. Existing Zoning, Land Use & Site Description

5.1 Zoning

In terms of the Zoning Scheme and the Beaufort West Municipality Zoning Register, the properties are zoned Agricultural Zone 1, permitting development parameters in the Table below :

	Agricultural Zone 1
Primary Use	Agriculture
Definition	<i>Agriculture means the cultivation of land for raising crops and other plants, including plantations, the keeping and breeding of animals, birds or bees, stud farming, game farming, intensive horticulture; intensive animal farming; a riding school or natural veld.</i>
Building Lines	30 m

5.2 Land Use & Site Description

The following extracts from the Final Environmental Impact Assessment Report (November 2024) describes the study area.

▣ Land Use

The area surrounding the Carissa WEF is characterised mostly by agricultural development with scattered farmsteads. The development area is located in a rural setting with the current land use of the site being natural grazing. Most residential dwellings featuring in the vicinity of the project area are scattered in a heterogeneous fashion, typical of a rural agricultural area. Land use is mostly agricultural activities (game and sheep farming) and wilderness areas (including eco-tourism).

▣ Topography and Climate

The topography of the area was broadly characterised as having an undulating terrain with low hills and extensive rocky plains with long dry grass and low thorny shrubs. Vegetation along the natural drainage lines was slightly thicker, predominantly consisting of Vachellia Karroo.

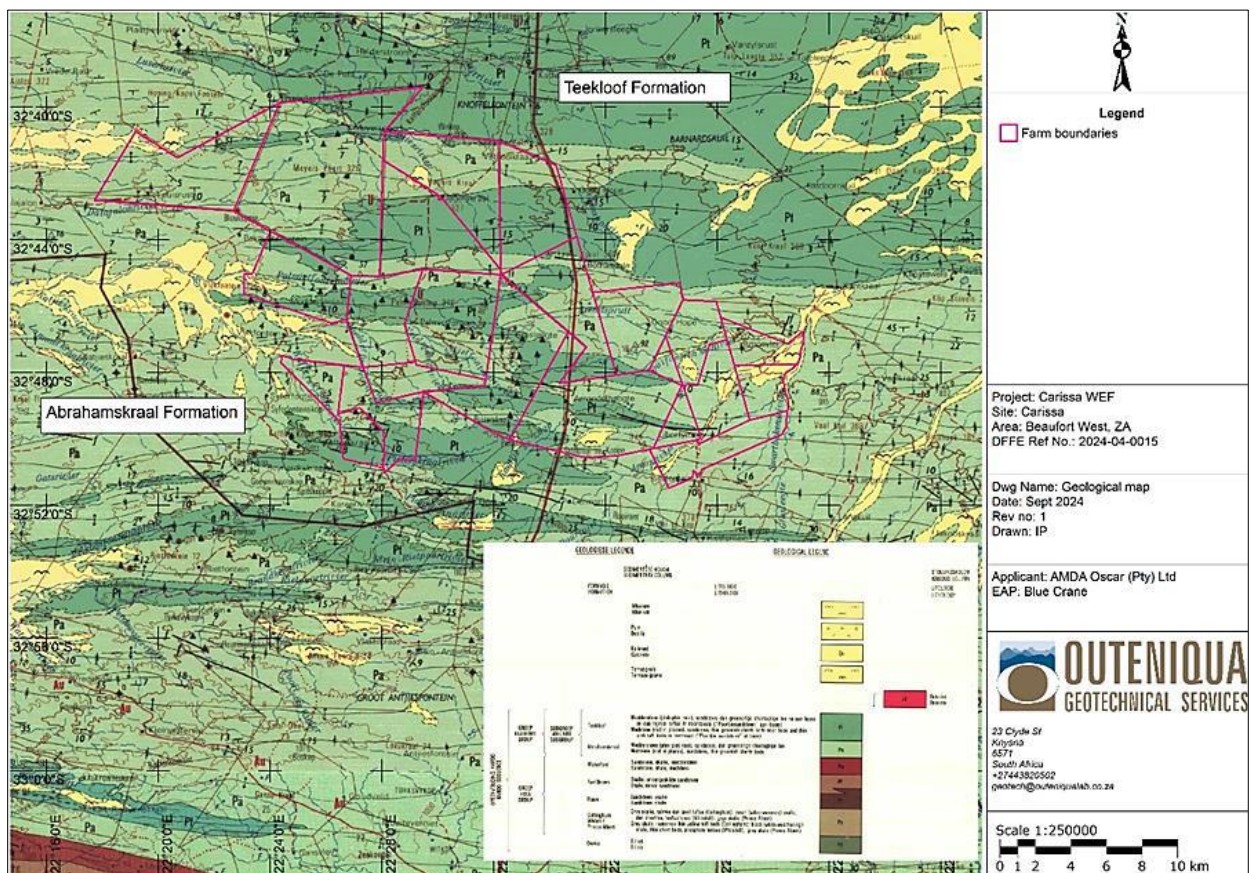




Climate data for the nearest major economic centre, Beaufort West, indicated a dry climate with low average annual precipitation of 392 mm with very hot summers and cool winters. According to the Köppen-Geiger classification, the prevailing climate in this region is categorised as BSk (cold, semi-arid). The Weinert climatic-N Value (Weinert, 1980) for the site area was 16 (dry), indicating the dominance of mechanical weathering processes.

Geology

The geology of the proposed Carissa WEF consisted of mudstone, sandstone and thin cherty beds of the Teekloof and Abrahamskraal Formations of the Adelaide Subgroup, Beaufort Group.



Geological Map of the site

Overlying deposits of Quaternary alluvium were mapped along natural drainage lines, indicated by the yellow on Figure 1.



Several small palaeofaults were indicated on the geological map due to the tectonic history of the region. The site was located in a zone of low seismic activity with maximum intensity of V on the Modified Mercalli Scale, or 4-5 on the Richter scale (felt by nearly everyone, loose fixtures rattled, no major damage to buildings), and a maximum peak horizontal ground acceleration of $<50\text{cm/s}^2$ ($0.05g$), with a 10% probability of being exceeded at least once in a period of 50 years.

■ Vegetation

The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type and, like the shrubs, are deciduous in response to rainfall events.

The PAOI is situated in the Gamka Karoo vegetation type according to SANBI (2018) which is a member of the Lower Karoo Bioregion.

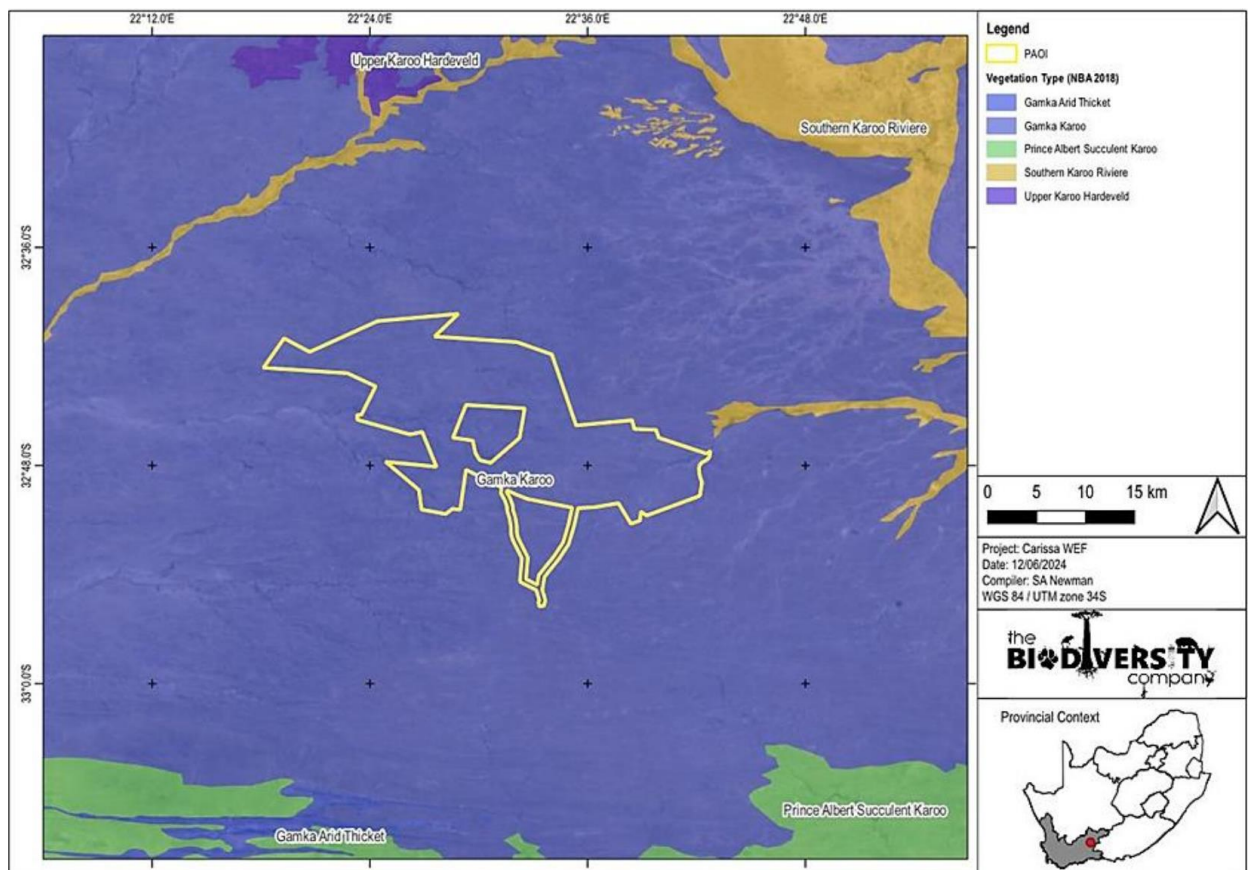
⇒ Gamka Karoo

The Gamka Karoo vegetation type is comprised of extremely irregular to slightly undulating plains covered by dwarf spiny shrubland dominated by Karoo dwarf shrubs (e.g., *Chrysocoma ciliata*, *Eriocephalus ericoides*, etc.). Trees are rare but occur sporadically (e.g., *Euclea undulata*). Dense stands of drought resistant grasses (*Stipagrostis* sp. and *Aristida* sp.) cover the broad sandy bottomlands, especially after the occurrence of rain.

This vegetation type is one of the most arid of the Nama-Karoo Biome, experiencing autumn and summer rainfall, peaking in March. The mean annual precipitation ranges from about 100 mm to about 240 mm, depending on the region.

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type.

This vegetation type is classified as least threatened. It has a conservation target of 16%, with about 2% statutorily conserved in the Karoo National Park, and some in private reserves, such as Steenbokkie Private Reserve (near Beaufort West). Only a small portion of this vegetation unit has undergone transformation. The alien plant, *Salsola kali*, poses a serious risk of infestations locally.



6. Activity Description & Parameters

6.1 Typical WEF Components

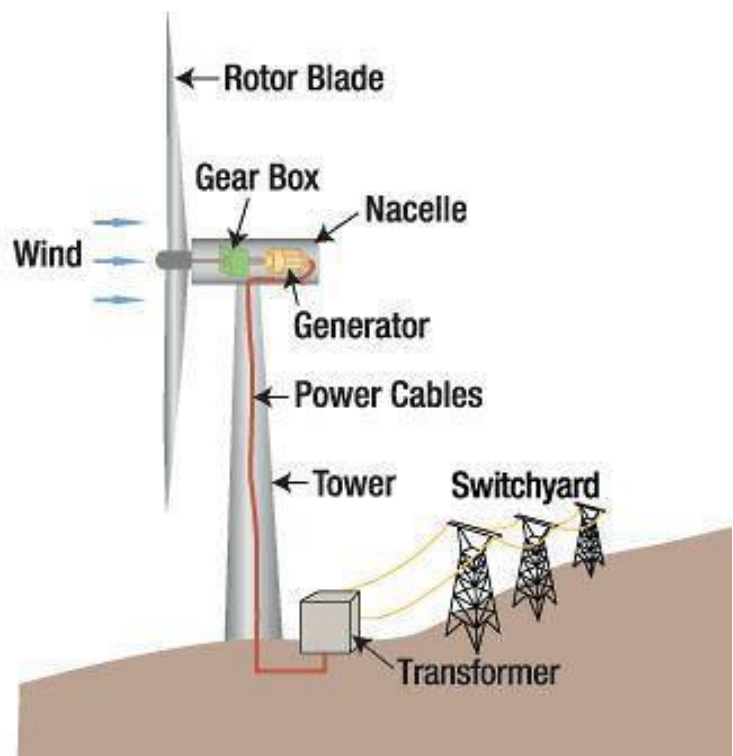
Each Wind Energy Facility requires several key components to facilitate the generation of electricity at a large scale. This includes, but not limited to :

- Wind turbines
- Underground cables and overhead high voltage power lines
- Substations / Switching Stations
- Battery Energy Storage System (BESS)
- Roads
- Construction Site Camps
- Batching Plants
- Material Handling Area
- Operation & Maintenance Area and Offices

The various Wind Energy Facility components are briefly described below.

▣ Wind Turbines

Wind turbines are mounted on a tower at a specified height to capture the most energy. In the case of the proposed Carissa WEF, the turbines will have a height of up to 280 m (maximum tip height) with a hub height of up to 180 m. The taller the turbine, the stronger the wind, as there are fewer obstacles in its path. A total of 154 wind turbines are proposed. The kinetic energy produced by wind results to the rotation of the wind turbines and their propeller-like blades thereby generating electricity. A wind turbine comprises of three (03) rotor blades and a nacelle which is mounted at the top of a tapered steel or concrete tower. The mechanical power produced by the rotating blades is transmitted to the generator located within the nacelle. A typical design of a turbine is provided below.



⇒ Rotor, Blades & Hub

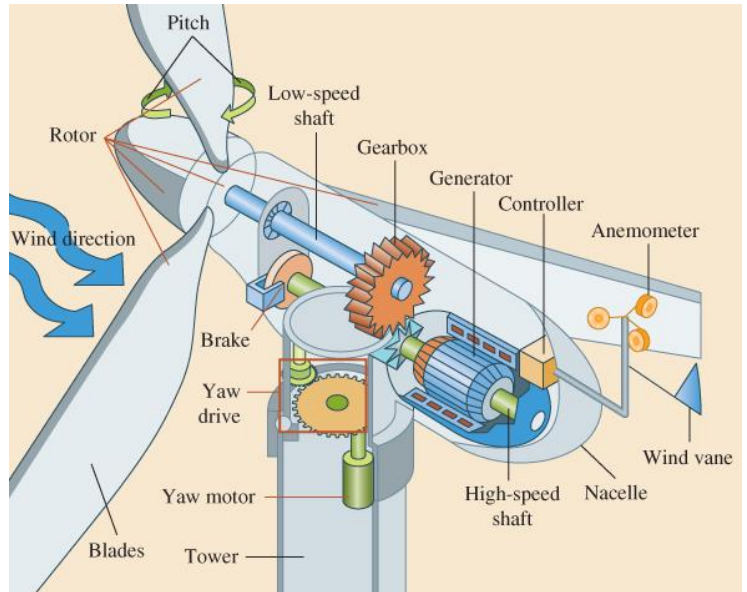
The rotor with two blades is cheaper and faster than three-blade rotors, but they are also noisier and they vibrate.

The blades are located on top of the turbine. Wind causes the air pressure on one side of the blade to decrease and the difference from the other side creates both lift and drag: when the lift is stronger than the drag, the rotor will spin.

The hub, as with the propellers on an airplane, the hub is the nose that points forward at the centre of the tower and where the blades are attached to it. The hub is connected to the mechanical parts in the nacelle, which is located behind it.



Rotor & Blades (Example only)



⇒ Nacelle

The nacelle is located on top of the tower and can turn 360° on its own axis, depending on the direction of the wind. It is named after the part of the wing of an airplane that contains the jet engines. It houses the key mechanical elements i.e., the gear box and generator.

⇒ Tower

The tower is usually made of concrete or steel. The tower usually has three sections and is assembled on-site. Its height varies, but it is generally the same as the diameter of the circle that the blades create when they spin. The tower also contains the power cables that connect the nacelle to the transformer on the ground.



Example of the Tower the blades are mounted on

⇒ Hardstand & Foundation

The foundation which is a large, heavy structural block of concrete in the ground that supports the entire turbine and the forces acting on it.



Hardstand & Foundation (Example only)

▣ **Power Transmissions**

The electricity generated by the turbines on each Wind Energy Facility needs to be collected, transformed and then evacuated to the national grid. To allow efficient transmission, the electricity undergoes a voltage “step-up” process that occurs at each wind turbine (either in the turbine or in a transformer container next to the turbine), and again at one of the Wind Energy Facility Substations where power is stepped up to the collector substation. The power is then transferred through a Switching Station.

Each turbine will be connected to their respective Wind Energy Facility Substation via high voltage power lines. For the most part cables will be laid underground in trenches, generally running alongside new or proposed internal roads, but sometimes deviating from these. In limited instances, where burying of cables is not possible due to technical, geological, environmental or topographical constraints, then short overhead power lines will be erected to traverse these constrained areas.

Internal overhead power lines (where needed) will be spanned using monopoles or custom made wooden structures.

■ Grid Connection Options

Two (02) grid connection corridor options have been identified for assessment for the placement of the grid connection infrastructure to transmit energy generated from the on-site substations / switching stations to the proposed on-site and/or off-site MTS. The grid connection options are as follows :

⇒ Southern Grid Connection Corridor (Option 1):

- Two (02) on-site facility substations/switching stations (i.e., one to the east of the facility and one to the west of the facility) up to 132 kV each;
- Two (02) grid connection corridors to connect the on-site facility substations/switching stations to the proposed off-site Galenia Main Transmission Substation⁴ (MTS). Each corridor is up to 15 km long and up to 600 m wide;
- Up to 132 kV internal overhead power line to connect the two (02) facility substations/switching stations (east-west substations/switching stations). The power line will be located within a 600 m wide corridor;
- Up to 132 kV double circuit overhead power lines to connect the facility substations/switching stations to the off-site Galenia MTS; and
- Up to 400 kV Loop-in-Loop-out (LILO) connection to connect/tie the proposed Galenia MTS into the existing 400 kV overhead power lines. The overhead power lines will be placed within 500 m and up to 2 km long grid corridors.

⇒ Northern Grid Connection Corridor (Option 2):

- Two (02) on-site facility substations/switching stations (i.e., one to the east of the facility and one to the west of the facility) up to 132 kV each;
- Two (02) grid connection corridors to connect the on-site facility substations/switching stations to the proposed on-site Main Transmission Substation (MTS). Each corridor is up to 17 km long and up to 500 m wide;
- Up to 132 kV internal overhead power line to connect the two (02) facility substations/switching stations (east-west substations/switching stations). The power line will be located within a 600 m wide corridor;
- Up to 132 kV double circuit overhead power lines to connect the facility substations/switching stations to the proposed on-site MTS; and
- Up to 400 kV Loop-in-Loop-out (LILO) connection to connect/tie the proposed on-site MTS into the existing 400 kV overhead power lines. The overhead power lines will be placed within 500 m and up to 1.6 km long grid corridors.

The full extent of the development area and the two grid connection options have been considered as part of this final Scoping Report with the aim of confirming the suitability of the area from an environmental and social perspective and thereby to enable the identification of a suitable development footprint for the placement of the infrastructure. The development footprint will be defined based on the outcomes of the scoping phase and will be further assessed in the EIA phase, which will include the assessment of a detailed facility layout.

The properties on which the facility is to be constructed will be leased by AMDA Oscar (Pty) Ltd from the property owners for the life span of the project (minimum of 25 years).

The area surrounding the Carissa WEF is characterised mostly by agricultural development with scattered farmsteads. The development area is located in a rural setting with the current land use of the site being natural grazing. Most residential dwellings featuring in the vicinity of the project area are scattered in a heterogeneous fashion, typical of a rural agricultural area. Land use is mostly agricultural activities (game and sheep farming) and wilderness areas (including eco-tourism).

▣ **Battery Energy Storage System (BESS)**

A BESS is a type of energy storage power station that uses a group of batteries to store electrical energy. These battery containers will stand in a dedicated area next to each of the proposed on-site substations (i.e., east and west on-site substations).

Two (02) BESS technology alternatives are under consideration for the Carissa WEF. These include:

- Solid State Battery Electrolytes - Solid state battery electrolytes, such as lithium-ion (Li-ion), zinc hybrid cathode, sodium ion, flow (e.g., zinc iron or zinc bromine), sodium sulphur (NaS), zinc air and lead acid batteries, can be used for grid applications. Compared to other battery options, Li-ion batteries are highly efficient, have a high energy density and are lightweight. As a result of the declining costs, Li-ion technology now accounts for more than 90% of battery storage additions globally (IRENA, 2019).
- Redox-Flow Technology - Flow batteries use solid electrodes and liquid electrolytes. The most used flow battery is the Vanadium Redox Flow Battery (VRFB), which is a type of rechargeable flow battery that employs vanadium ions in different oxidative states to store chemical potential energy.

The BESS is considered a key element in modern day energy systems making it a versatile technology alternative that can operate in various network configurations and structural set ups, such as :

- On-grid which refers to being connected to the main electrical grid where the BESS can provide services such as load balancing and frequency regulation.
- Off-grid which refers to BESS being the primary source of power, often combined with renewable energy sources like solar or wind, to supply electricity in remote areas or during grid outages.
- Centralised setup systems which refer to a large BESS being located at a central point and provide services to the surrounding area.
- Decentralised setup system which refers to smaller BESS units that can be distributed across various locations for example in residential or commercial buildings to enhance the local power quality and grid stability.



Battery Energy Storage System (Example only)

A typical BESS comprises of several components that work together to enable functionality which include :

BESS Components	Description
Battery Packs	Units that house multiple rechargeable batteries, efficiently storing and releasing energy
Inverter	Converts battery output (DC) into usable alternating current (AC) for devices and grid connection
Battery Management System	Monitors and manages battery performance, charge state, and health, ensuring safety and optimal operation
Cooling and Thermal Management	Maintains safe battery operating temperatures by managing heat generated during charging and discharging
Control System	Maintains safe battery operating temperatures by managing heat generated during charging and discharging
Energy Management System	Analyses real-time data, energy prices, and grid conditions to optimise BESS operation for maximum efficiency and cost-effectiveness
DC-DC Converters	In certain configurations, these devices manage voltage levels for efficient energy transfer between components
Enclosure and Safety Systems	Provides physical protection against environmental factors and implements safety measures to prevent hazards like thermal runaway and fires
Monitoring and Control Interfaces	Allows real-time monitoring and adjustment of BESS performance and parameters
Grid Connection and Power Electronics	Facilitates BESS interaction with the grid, delivering services such as frequency regulation, voltage support, and demand response
Communication Systems	Enables communication with external entities, like grid operators, for coordinates and efficient operation



Battery Energy Storage System (Example only)

6.2 WEF Construction Process

The Carissa WEF Construction process will comprise of four (4) phases, namely :

- Design and Pre-Construction
- Construction
- Operation
- Decommissioning

▣ Design and Pre-Construction Phase

- Post-authorisation factors influence the final design of the facility and therefore small-scale modifications such as turbine micro-siting are expected.
- The EPC Contractor, responsible for the overall construction of the project, will attempt to comply with the approved facility design as far as possible. However, the construction process is dynamic and unforeseen changes to the project specifications may take place.
- Prior to construction commencement, surveys will be required including, but not limited to confirmation of the micro-siting footprint (i.e., the precise location of the turbine placement, substations and the plant's associated infrastructure) and a geotechnical survey.
- Geotechnical surveys are executed by geotechnical engineers and geologists with the purpose to design earthworks and foundations for structures and to execute earthwork repairs necessitated due to changes in the subsurface environment.

■ Construction Phase

- The majority of the labour force is expected to be sourced from the surrounding towns, and no labour will be accommodated on-site during the construction period. This is however dependent on the availability of the required skills in the area.
- At the peak of construction, the proposed project is likely to create a maximum of 1 500 employment opportunities. These employment opportunities will be temporary, and will last for a period of up to 24 months (i.e., the length of construction).
- Employment opportunities generated during the construction phase will include low skilled, semi-skilled, and skilled opportunities.
- Employment opportunities for the proposed WEF will peak during the construction phase and significantly decline during the operation phase.
- Access to the site will be established for the construction of the facility. Within the facility development footprint itself, access will be required from new / existing roads for construction purposes (and limited access for maintenance during operation).
- Site preparation activities will include clearance of vegetation. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and / or spread on site.
- The use of local borrow-pits may be required.
- The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the facility. Some of the components (i.e., substation transformer and turbines) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTA)
- 28 by virtue of the dimensional limitations.
- Laydown and storage areas will be required for typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The laydown area will be used for the general placement / storage of construction equipment as well as the storage of wind components including cranes required for the erection and assembly of the turbines.
- Installation of the turbines and structural and electrical infrastructure will be undertaken that is required for the operation of the facility.
- For turbine establishment, a crane hard stand is required at each turbine location. Concrete foundations will also need to be constructed at each turbine location to support a mounting ring. The type of concrete foundations will be influenced by the site geotechnical conditions.
- The Battery Energy Storage System will be installed as per the factory instructions.
- The establishment of the auxiliary infrastructure (including the substations) and support buildings will require the clearing of vegetation and levelling of the development site, and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.
- A power line is constructed by surveying the power line route / corridor, constructing foundations for the towers, installing the towers, stringing the conductors, and finally rehabilitating disturbed areas and protecting erosion sensitive areas.
- Once construction is completed and all construction equipment has been removed, the site will be rehabilitated where practical and reasonable. In addition, on full commissioning of the wind energy facility, any access points which are not required during operation must be closed and rehabilitated accordingly.

▣ **Operational Phase**

- The facility is expected to operate for a minimum of 25 years.
- The facility will operate continuously, 7 days a week.
- While the facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance (O&M) plant include monitoring and reporting the performance of the facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security.
- Up to 100 permanent staff and additional contractors (number varies) for temporary ad hoc maintenance will be required.

▣ **Decommissioning Of The Wind Farm**

- The economic viability of the facility following the initial 25-year operational lifespan, will determine if the facility will be decommissioned or the operational phase will be extended.
- If it is deemed financially viable to extend the operational phase, existing components would either continue to operate, or be disassembled and replaced with new, more efficient technology / infrastructure available at the time. This replacement will be within the ambit of the Environmental Authorisation.
- Site preparation activities include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.
- The equipment to be removed will depend on the land use proposed for the site at the time.
- All above ground facilities that are not intended for future use at the site will be removed. Much of the above ground wire and steel, are recyclable materials and would be recycled to the extent feasible.
- The site will be rehabilitated and can be returned to agriculture or another beneficial land-use, to be determined through consultation with the affected landowner.

6.3 Social Impact Assessment (SIA)

The following extracts from the Social Impact Assessment Report describes the Social Impact of the Carissa WEF in the area :

▣ **Key Findings**

The Beaufort West, Prince Albert and surrounding communities are some vulnerable communities within the project area that may be affected by the development of the Carissa WEF and its associated infrastructure. The construction is traditionally associated with the greatest social impact communities, as a result the town of Beaufort West, Prince Albert and its surrounding communities may be affected by social impacts. The impact on Beaufort West and its surrounding communities may be greater than the social impacts on the town of Prince Albert and its surrounding communities, as the town of Beaufort West is closer in proximity and a larger town than the town of Prince Albert.

Therefore, the majority of social impacts are expected to be associated with the town of Beaufort West rather than Prince Albert, although some social impacts can still be associated with the town of Prince Albert.

Many of the social impacts are unavoidable and will take place to some extent but can be managed through the careful planning and implementation of appropriate mitigation measures. Several potential positive and negative social impacts have been identified for the project, however an assessment of the potential social impacts indicated that there are no perceived negative impacts that are so significant to allow them to be classified as "fatal flaws".

Based on the social impact assessment, the following general conclusions and findings can be made:

- The construction phase of the Carissa WEF, like any other construction project, may bring about negative social impacts, such as the influx of non-local workers and job seekers, disturbance due to noise and dust pollution, increase in road usage which could lead to road damage, and safety concerns in the region. The impacts are not limited to WEF projects but rather common in most construction projects. These impacts can be reduced by implementing proposed mitigation measures. Therefore, taking proactive measures to minimise the significance of these impacts on Beaufort West and the surrounding communities.
- The development of the Carissa WEF will generate employment opportunities for individuals from the Beaufort West and surrounding communities. During the construction phase, approximately 1 500 job opportunities will be created, providing a temporary source of employment. Specifically, this would benefit the Beaufort West LM as a large proportion of the population is not economically active (44.1%) or is unemployed (12.2%). Following the construction phase, a limited number of job opportunities will be available during the operational phase. By reducing the region's dependency and boosting overall quality of life, the Carissa WEF will contribute significantly to the community's economic growth. Additionally, this would create jobs outside the current main job creator in the region.
- The implementation of the Carissa WEF is expected to enhance the skill development in the community and lead to better employment opportunities. This, in turn, will equip the workers with valuable knowledge and skills that can be beneficial for their future professional endeavours. Consequently, the overall educational level of the people residing in the Beaufort West LM is expected to improve.
- The Beaufort West LM's economy has the potential to benefit from the proposed project by fostering entrepreneurial growth and opportunities, particularly for local businesses in Beaufort West. These businesses, involved in the provision of general materials, goods, and services during both the construction and operational phases, are likely to experience positive impacts. Furthermore, the cumulative effects of developing additional wind energy facilities to the currently proposed facilities could amplify these benefits.
- The proposed development of the Carissa WEF represents an investment in non-polluting and renewable energy infrastructure. In comparison to energy generated through the combustion of fossil fuels, this presents a favourable social benefit for society.
- It should be noted that the perceived benefits associated with the Carissa WEF, which include renewable energy generation and local economic and social development, outweigh the perceived impacts associated with the project.
- The proposed development of the Carissa WEF could reduce the possibility of load shedding occurring within the country future, specifically reducing the current strain on Eskom power generation facilities. Not only would it increase our green energy generation, but reduce strain imposed on companies as a result of load shedding. In return this could lead current future work opportunities to be of a more stable nature and not impose additional strain on companies.

■ Recommendations

The following recommendations are made based on the SIA. The proposed mitigation measures should be implemented to limit the negative impacts and enhance the positive impacts associated with the project. Based on the social assessment, the following recommendations are made:

- The appointment of a CLO to assist with the management of social impacts and to deal with community issues, if feasible.
- It is imperative that local labour be sourced, wherever possible, to ensure that benefits accrue to the local communities. Efforts should be made to involve local businesses during the construction activities. Where possible. Local procurement of labour and services / products would greatly benefit the community during the construction and operational phases of the project.
- Local procurement of services and equipment is required where possible in order to enhance the multiplier effect.
- Involve the community in the process as far as possible (encourage co-operative decision making and partnerships with local entrepreneurs).
- Employ mitigation measures to minimise the dust and noise pollution and damage to existing roads.
- Safety and security risks should be considered during the planning / construction phase of the proposed project. Access control, security and management should be implemented to limit the risk of crime increasing in the area

■ Conclusion

The proposed project and associated infrastructure are unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the project could be developed subject to the implementation of recommended mitigation measures and management actions identified for the project. It is therefore Donaway Environmental's recommendation that the project, with the associated layout, be approved provided that mitigation measures are implemented. In terms of the grid connection alternatives, both alternatives are suitable options as they both present similar social related impacts.

The proposed Carissa WEF has the potential to generate additional income and employment opportunities for Beaufort West and the surrounding communities, with the addition of these benefits occurring within the town of Prince Albert and its surrounding communities although less significant. These benefits could be particularly significant to reduce the dependency of job opportunities within the main employment sectors. As a whole, unemployment in South Africa is significantly high and additional job opportunities would not only benefit the region but the overall South African employment ratio. Positive impacts can be associated with the Carissa WEF with regard to additional renewable energy facilities and reducing the current load on existing Eskom power generation facilities.

7. Renewable Energy in Context

Due to global concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. Renewable energy is recognised internationally as a major contributor in protecting the environment (including biophysical, social and economic), when compared to energy generation that relies on fossil fuels, such as coal fired power stations and the use of oil and gas. Renewable energy projects also provide a wide range of environmental, economic and social benefits that can contribute towards long-term global sustainability.

In South Africa, the national utility company, Eskom, sources up to 86.97% of its electricity needs from fossil fuels (World Atlas, 2016). Eskom recognises that it “is crucial that the private sector plays a role in addressing the future electricity needs of the country as this would reduce the funding burden on Government, relieve the borrowing requirements of Eskom and introduce generation technologies that Eskom may not consider part of its core function which may play a vital role in the future electricity supply options in the country” (Eskom, 2018).

As a result, the South African Government has developed an Integrated Resource Plan (IRP) in which a target was set to source 17.8 Gigawatts (GW) of the country’s electricity supply from renewable energy sources, over a 20-year period from 2010 to 2030.

A review and update of the IRP in 2019 requires a further additional 14 400MW to be generated by wind power facilities and 6 000MW through solar (2019 to 2030).

In support of this strategic target, the Department of Energy (DoE) has to date issued a number of ministerial determinations for the procurement of renewable energy. These renewable energy targets are procured through a competitive tendering process called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) run by the DoE in conjunction with the National Treasury and the Development Bank of Southern Africa (DBSA).

The proposed Carissa WEF would therefore have global significance as it would contribute to South Africa’s national commitment to transition to a low carbon economy. Investments in this technology will not only benefit our generation, but many generations to come.

In South Africa, renewable energy forms an important part of our energy mix. One of the reasons for this is the substantial foreign equity and financing that has been invested in Renewable Energy Independent Power Producer projects by which amounted to R201.8 billion (R75 billion of which has been wind energy) by June 2018 (DoE, 2018b). Additionally, beyond the foreign investment, localised socio-economic benefits have also been realised through investment in socio-economic development initiatives and enterprise development programmes identified within each project’s sphere of influence.

The 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 Green House 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. There is therefore an increasing need to establish a new source of generating power in South Africa within the next decade.

The use of renewable energy technologies, as one of a mix of technologies needed to meet future energy consumption requirements. It must be remembered that wind energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

The overall need and desirability of the proposed development, in the context of developing renewable energy generation in South Africa and globally, is considered and described below. In summary wind energy is desirable as it :

- Creates a more sustainable economy by promoting South Africa's energy policy towards energy diversification.
- Reduces the demand on scarce resources such as water by promoting energy generating facilities which are less resource intensive.
- Assists in meeting international commitments to carbon emission targets in line with global climate change commitments.
- Reduces pollution by using 'cleaner' energy generating mechanisms and reducing the demand on carbon-based fuels.
- Promotes local economic development by creating jobs and promoting skills development.
- Enhances energy security by diversifying generation.

8. Guidelines for Decision Making

Decision making by the Beaufort West Municipality should be based, inter alia, on legislative guidelines and informants :

- Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013)
- Western Cape Land Use Planning Act 2014 (Act 3 of 2014) (LUPA)
- By-law on Municipal Land Use Planning for Beaufort West Municipality (2018)
- Beaufort West Standard Zoning Scheme By-Law (2020)

The Beaufort West Municipal Planning By-law stipulates (Section 65) that when a decision is made on an application, regard must be had to a number of criteria, amongst others, the Municipal and District Spatial Development Frameworks (SDFs) and Integrated Development Plans (IDP's), Provincial Spatial Development Framework, as well as any National policies, principles, norms and standards.

Although decision making on land use matters is a holistic and multi-disciplinary process, the above legislated criteria should form the basis for well-informed and sound decision making.

Decision making by the Beaufort West Municipality should be based, inter alia on legislative guidelines and informants :

Section 7 of SPLUMA stipulates :

The following principles apply to spatial planning, land development and land use management :

- *The principle of spatial justice*
- *The principle of spatial sustainability*
- *The principle of efficiency*
- *The principle of spatial resilience*
- *The principle of good administration*

Section 22 (1) of SPLUMA stipulates :

A Municipal Tribunal or any other authority to make a land development decision in terms of this Act or any other law relating to land development, may not make a decision which is inconsistent with a municipal spatial development framework.

Section 42 (1) of SPLUMA stipulates :

In considering and deciding an application a Municipal Planning Tribunal must –

- *be guided by the development principles set out in Chapter 2*
- *make a decision which is consistent with norms and standards, measures designed to protect and promote the sustainable use of agricultural land, national and provincial government policies and the municipal spatial development framework*
- *take into account –*
 - *the public interest*
 - *the constitutional transformation imperatives and the related duties of the State*
 - *the facts and circumstances relevant to the application*
 - *the respective rights and obligations of all those affected*
 - *the state and impact of engineering services, social infrastructure and open space requirements*
 - *any factors that may be prescribed, including timeframes for making decisions*

9. Spatial Planning & Land Use Management Act (SPLUMA)

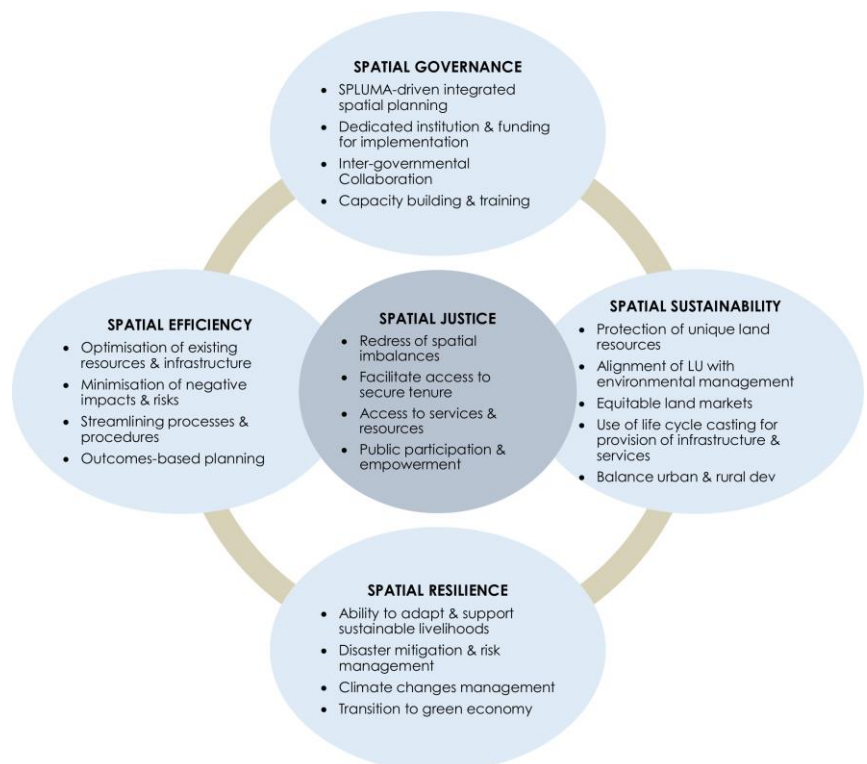
In terms of the provisions of Section 6 and Section 7 of SPLUMA, the general principles set out in Chapter 2 apply to all organs of state and other authorities responsible for the implementation of legislation regulating the use and development of land.

Land use planning is guided by the following Land Use Planning Principles:

- Principle of spatial justice
- Principle of spatial sustainability
- Principle of efficiency
- Principle of spatial resilience
- Principle of good administration

The principles are aligned with and support Section 7 of the Spatial Planning & Land Use Management Act principles.

The following Development Principles are applicable to spatial planning, land development and land use management and have been addressed accordingly.



▣ **The Principle of Spatial Justice**

- The development is outside of any urban areas. The closest town is Beaufort West.
- The development will ensure significant financial investment in the area.
- The development would help to address unemployment in the area and drive economic development.
- Investment will ensure social upliftment and improve rural livelihoods.
- The development of WEF's and renewable energy is supported through various National, Provincial and Local policy frameworks.
- The development is consistent with the applicable Spatial Development Frameworks (Western Cape, Central Karoo DM and Beaufort West LM).

▣ **The Principle of Spatial Sustainability**

- The WEF will contribute towards the prevention of pollution and unsustainable ecological degradation through the use of non-renewable energy resources. It promotes sustainable development and use of renewable energy has a much smaller carbon footprint than coal, which is currently the dominant form of electricity generated in South Africa.
- Renewable energy can be considered as an alternative in meeting the need for increased electricity demand over other sources of generation such as fossil fuels. These reasons include :
 - Positive impact on climate change;
 - Overcoming the country's energy constraints;
 - Diversification and decentralisation of supply;
 - Reduced costs of energy; and
 - Positive economic development including job creation.
- With a view to reducing the effects of climate change, South Africa has committed to decreasing its dependence on fossil fuels, and increasing its utilization of renewable energy. The additional power produced by WEFs would supplement the national grid with a sustainable form of renewable energy, thus driving regional and national economic development, as well as providing local business opportunities, skills development and employment opportunities.
- Conventional coal fired power stations use large quantities of water during their cooling processes. WEFs require limited amounts of water during construction and a minimal amount of water during operation.
- Throughout the EIA process, Critical Biodiversity Areas (CBAs), sensitive areas and no-go areas in the proposed development site were identified through specialist input. The presented final layout avoids these areas where possible, and if not possible due to wind farm viability, mitigation measures are to be implemented to assist in reducing negative impacts and enhancing positive impacts.
- Environmental Approval will be obtained from the Department of Forestry, Fisheries and the Environment, prior to development.
- Employment opportunities (direct, indirect and induced), will be created during construction.

▣ **The Principle of Efficiency**

- The development will contribute towards lower carbon emission goals to combat climate change and provide cleaner energy than coal which currently makes up the large majority of the national energy mix.
- Wind power is the most cost effective form of electricity generation in the country and this project would make use of the area's wind resources to provide cost-effective electricity to the national grid.
- The footprint of the proposed infrastructure would equate to a small percentage of the total land area.

▣ **The Principle of Spatial Resilience**

- The Carissa WEF can contribute up to 1 000 MW of electricity to the national grid.
- The WEF has a lifespan of more than 20 years and will contribute significantly to the local economy.
- Extensive research and numerous specialist studies provided input in the design and optimisation of the WEF.
- Specialist studies included, but not limited to agriculture, ecological, avifauna, social, heritage and visual impact were conducted.
- The impact assessment process confirmed that negative impacts can be mitigated.
- The Environmental Management Programme will ensure strict implemental guidelines during construction and operation.

▣ **The Principle of Good Administration**

- Prior to implementation, all relevant legislative approval will be obtained to ensure legislative compliance.
- The application for Consent Use supports the principles of the relevant policies, guidelines and Spatial Development Frameworks.
- The development will be implemented, subject to a positive Environmental Authorisation and EMPr.
- Approval from all applicable legislation will be obtained prior to implementation.

10. National Policy

The following National Policy Guidelines support the development of Renewable Energy Projects.

10.1 White Paper on Energy Policy (1998)

The White Paper on Energy is a policy which contains the South African government's approach to the supply and consumption of energy. The approach set out in the White Paper was aimed at building confidence, clarifying organisational roles, communicating policy effectively and integrating policy processes. Different environmental and economic pressures further necessitated a redraft.

The policy proposes that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.

10.2 White Paper on Renewable Energy Policy (2003)

The White Paper on Renewable Energy Policy supplements the Energy Policy and contains government's vision, policy principles, strategic goals and objective for promoting and implementing renewable energy in South Africa.

The White Paper identifies that renewable energy will require a large financial injection and that the South African government has limited resources to fund such projects. Consequently, funding should be sourced internationally as provided for through the Kyoto Protocol and through various other means.

10.3 National Climate Change Response White Paper (2011)

This White Paper presents South Africa's vision for an effective climate change response and the long-term transition to a climate-resilient and lower-carbon economy and society. The country's response has two objectives :

- Manage inevitable climate change impacts through interventions that build and sustain social, economic and environmental resilience and emergency response capacity.
- Make a fair contribution to the global efforts to stabilise greenhouse gas (GHG) concentrations in the atmosphere.

10.4 National Development Plan 2030 (2012)

The National Development Plan (NDP) aims to eliminate poverty and reduce inequality by 2030, by growing the economy faster and in ways that benefit all South Africans. The overarching land development goals of the NDP include creating employment opportunities and raising income levels, creating an inclusive and integrated rural economy, improving infrastructure provision; reversing the spatial effects of apartheid, ensuring environmental sustainability, improving education, healthcare and safety of communities, and improving governance.

With regards to energy, the NDP set the objective of procuring at least 20 000MW of renewable energy by 2030 and decommissioning 11 000MW of ageing coal-fired power stations.

10.5 National Integrated Resource Plan for Electricity 2010-2030 (2019)

Electricity is identified as one of the core elements of a decent standard of living that comes from the NDP. As a point of departure, the NDP introduced the Integrated Resource Plan (IRP) to formulate its vision for the energy sector.

Specific emphasis is placed on the broadening electricity supply technologies to include gas, imports, nuclear biomass and renewable (wind, solar and hydro) in order to meet future electricity needs and to reduce South Africa's CO₂ emissions in the most cost-effective way. A Revised Balanced Scenario (RBS) which would result in the country's power supply-needs being met through a combination of renewable energy, coal powered plants, gas, hydro and nuclear, is set forward. The IRP for the period 2010-2030 proposed to secure 17 800MW of renewable energy capacity by 2030.

A review and update of the IRP in 2019 requires a further additional 14 400MW to be generated by wind power facilities and 6 000MW through solar facilities (2019 to 2030).

10.6 National Integrated Energy Plan (2016)

The National Integrated Energy Plan (IEP) proposes a diversified energy mix which reduces reliance on a single or a few primary energy sources such as coal, nuclear, natural gas, crude oil, solar, wind and biomass. Solar PV and CSP with storage, present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity.

Apart from the obvious benefit of producing much needed electricity, both solar and wind technologies have great potential for job creation and skills development.

10.7 National Infrastructure Plan (2012)

The National Infrastructure Plan (NIP) was adopted in 2012 and the aim of this plan is to transform the country's economic landscape whilst simultaneously creating new jobs and strengthen the delivery of basis services. The NIP is an important component of the NDP and the New Growth Path framework, as it aims to catalyse economic development and job creation through infrastructure development.

Strategic Integrated Projects (SIPs) identified in the NIP include :

■ **SIP8 : Green energy in support of the South African economy**

Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the IRP.

■ **SIP10 : Electricity transmission and distribution for all**

Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.

10.8 Strategic Environmental Assessment for Wind & Solar PV Energy (2015)

The Department of Forestry, Fisheries and the Environment (DFFE) undertook several Strategic Environmental Assessments (SEAs) to streamline future EIA applications for energy projects, thereby streamlining the implementation of the NIP.

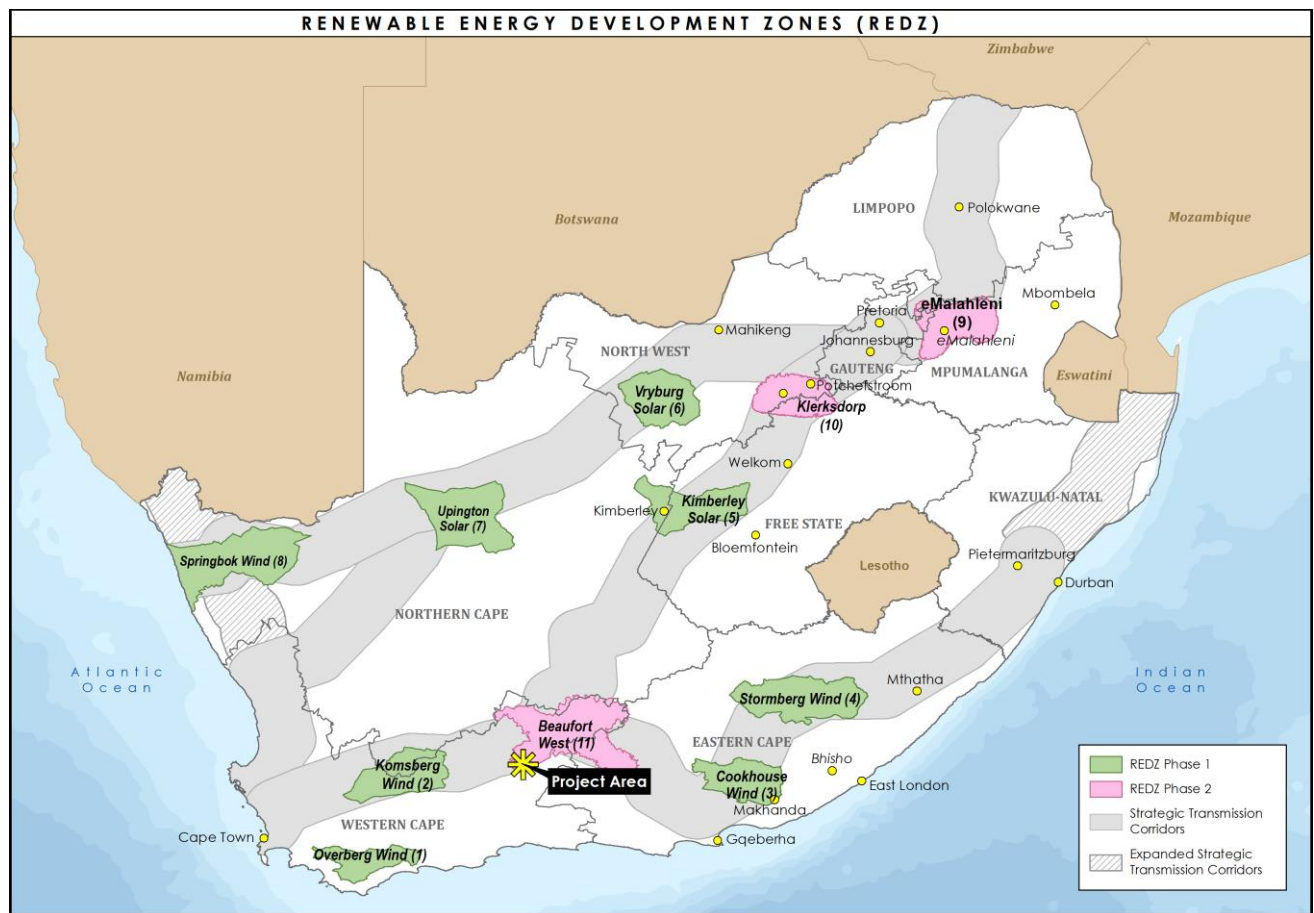
The Wind and Solar Photovoltaic (PV) Energy SEA aims to identify geographical areas best suited for the rollout of large-scale wind and solar PV energy facilities and infrastructure. These areas are referred to as Renewable Energy Development Zones (REDZs) and strategic transmission corridors. The SEA will ensure environmental responsible development, guide decision making for all levels and ensure coordinated projects.

REDZs refer to geographical areas where wind and solar PV development can occur in concentrated zones, which will lead to :

- a reduction of negative environmental consequences;
- alignment of authorisation and approval processes;
- attractive incentives; and
- focused expansion of the South African electricity grid.

The figure shows an illustration of the Carissa Wind Energy Facility in relation to the identified REDZs and Power Line Corridors. The Carissa Wind Energy Facility falls within the Beaufort West REDZ and the Central Corridor.

The Carissa Wind Energy Facility is subject to a Basic Assessment process and not a full EIA process, as well as a shortened timeframe of 57 days for the processing of an application for environmental authorisation.



DFEE Strategic Transmission Corridors (the site is situated in the central transmission corridor)

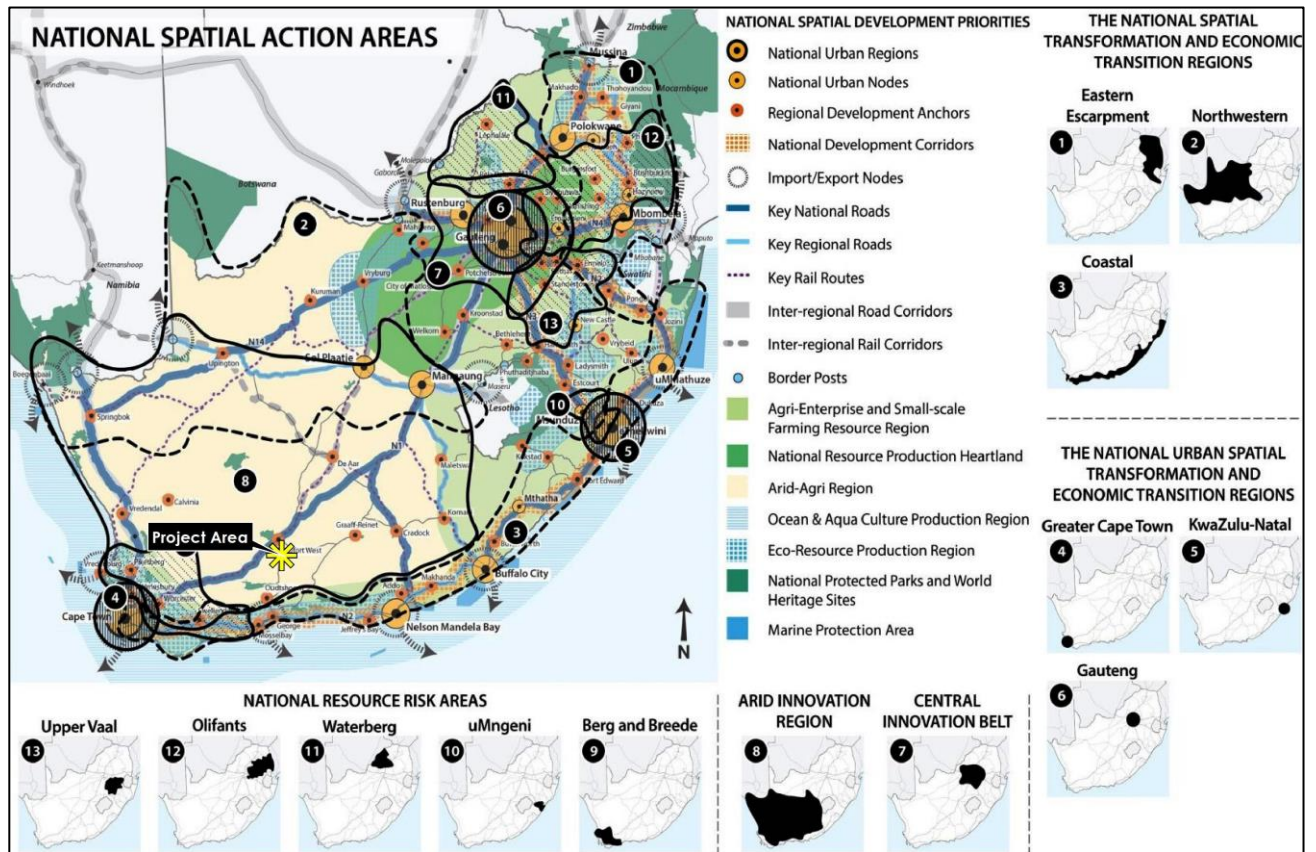
10.9 National Spatial Development Framework (2022)

The National Spatial Development Framework is guided by the Spatial Planning and Land Use Management Act (Act 16 of 2013) (SPLUMA) (Sections 5 and 13).

The NSDF is the first of its kind and the purpose is to :

- Support the National Development Priorities (NDP);
- Provide strategic, integrating and coordinating guidance to national sector planning;
- Pave the way and prepare the ground for National Spatial Planning as an ongoing activity by bringing about change in National Spatial Governance and structures required for this function in government;
- Galvanise State Action (investment and spending) on a set of National Spatial Development Priorities;
- Introduce Sub-national Spatial Development Planning in the form of “functional development regions”.

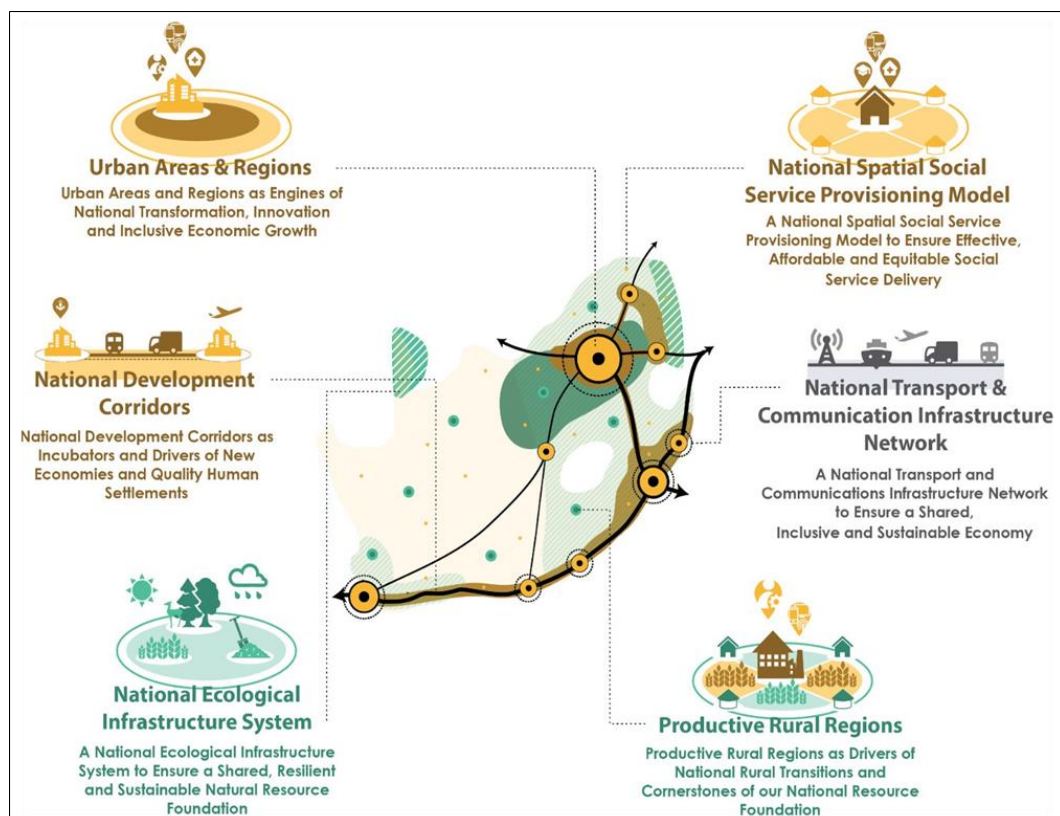
The NDP supports a move away from coal-based energy generation in line with international trends and climate protocols. Long-term spatial and infrastructure planning must therefore take this into account.



National SDF

In order to give spatial expression to the vision of the NSDF and to support the shifts that need to be made in accordance with the logic of the NSDF, a series of National Spatial Development Levers were developed.

Six such National Spatial Development Levers were developed.



The NSDF addresses the desired ideal spatial development pattern for South Africa in 2050, of which the pattern is divided into five sub-frames (outcomes) :

- NSDF Sub-Frame One: Inter-Regional Connectivity;
- NSDF Sub-Frame Two: The National System of Nodes and Corridors;
- NSDF Sub-Frame Three: The National Resource Economy Regions;
- NSDF Sub-Frame Four: The National Movement and Connectivity Infrastructure System; and
- NSDF Sub-Frame Five: The National Ecological Network

Following on from the ideal spatial pattern and the subsequent sub-frames, a set of five National Spatial Action Areas (NSAAs) have been developed. The NSAAs represent the most urgent strategic spatial development catalysts to bring about radical spatial transformation at scale, and manage and mitigate rising national risks, and as such, require immediate national action.

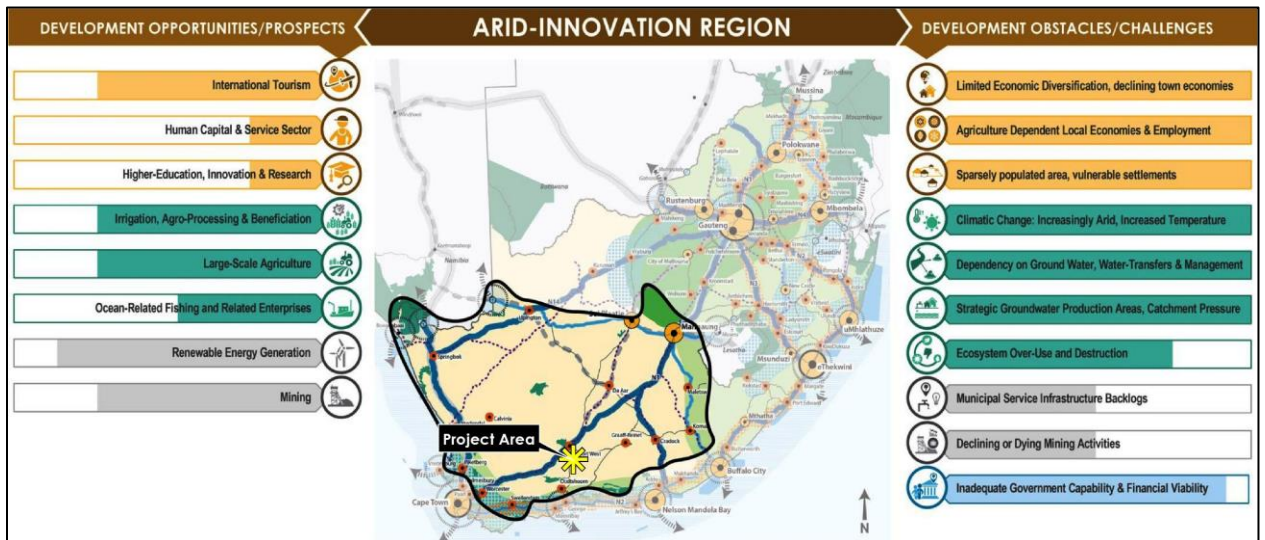
In terms of the NSDF, five Implementation Action Areas are identified. The proposed Carissa Wind Energy Facility is situated within the Arid Innovation Region.

■ Arid-Innovation Region

National Spatial Action Area	Relevant NSDF Sub-Frames			
	National System of Nodes & Corridors	National Resource Economy Regions	National Movement & Connectivity Infrastructure System	National Ecological Infrastructure Network
Arid-Innovation Region	<i>Strengthening regional development anchors as connecting, catalytic and interface points.</i>	<i>Supporting intensive, high-value agriculture by innovative means. Strengthening and expanding alternative energy generation.</i>	<i>Supporting connections between national urban nodes and regional development anchors.</i>	<i>Ensuring sustainable aquaculture activities that assist with ensuring regional and national food security. Managing land and settlement development and economic activities, to ensure the protection of critical natural resources.</i>

The NSDF confirms the significance of the Arid-Innovation Region (AIR) as NSAA. The region offers substantial, nationally significant opportunities that require careful and considered utilisation, including:

- unique and niche agricultural activities and fisheries
- internationally recognised and sought-after tourist attractions
- large and varied mineral deposits and vast shale gas reservoirs
- enormous potential for alternative energy generation
- the Square Kilometre Array (SKA), which is already making a significant contribution to the work of the local and the international scientific community, and offers many more opportunities



10.10 Karoo Regional Spatial Development Framework (SDF) (2023)

The Karoo Regional Spatial Development Framework is an instrument to align spatial planning, government spending, government operational decisions and direct investment to support integrated regional development. The focus of the framework is spatial issues of regional interest or regional significance and provides the context for more detailed local scale planning.

The Karoo Regional SDF identified various regional drivers and shapers, including regional development pillars.

Renewable energy is identified as a priority regional development driver / shaper with a relative strength in sustaining or strengthening the base of 9 out of 10. This is significant in support of the proposed renewable energy facilities in the district.

REGIONAL DEVELOPMENT PILLARS



The Natural
Resource Base



The Human
Resource Base



The Movement Infrastructure
& Connectivity Base



The Institutional &
Government Services Base

Climate change mitigation and economic growth is further confirmed in the spatial vision :

The Karoo Region, where innovation based on unique ecosystems, natural assets, cultural heritage and traditional local knowledge is used to build a sustainable future for local communities that will stand as a global testament to human ingenuity, adaptability and resilience in arid regions.

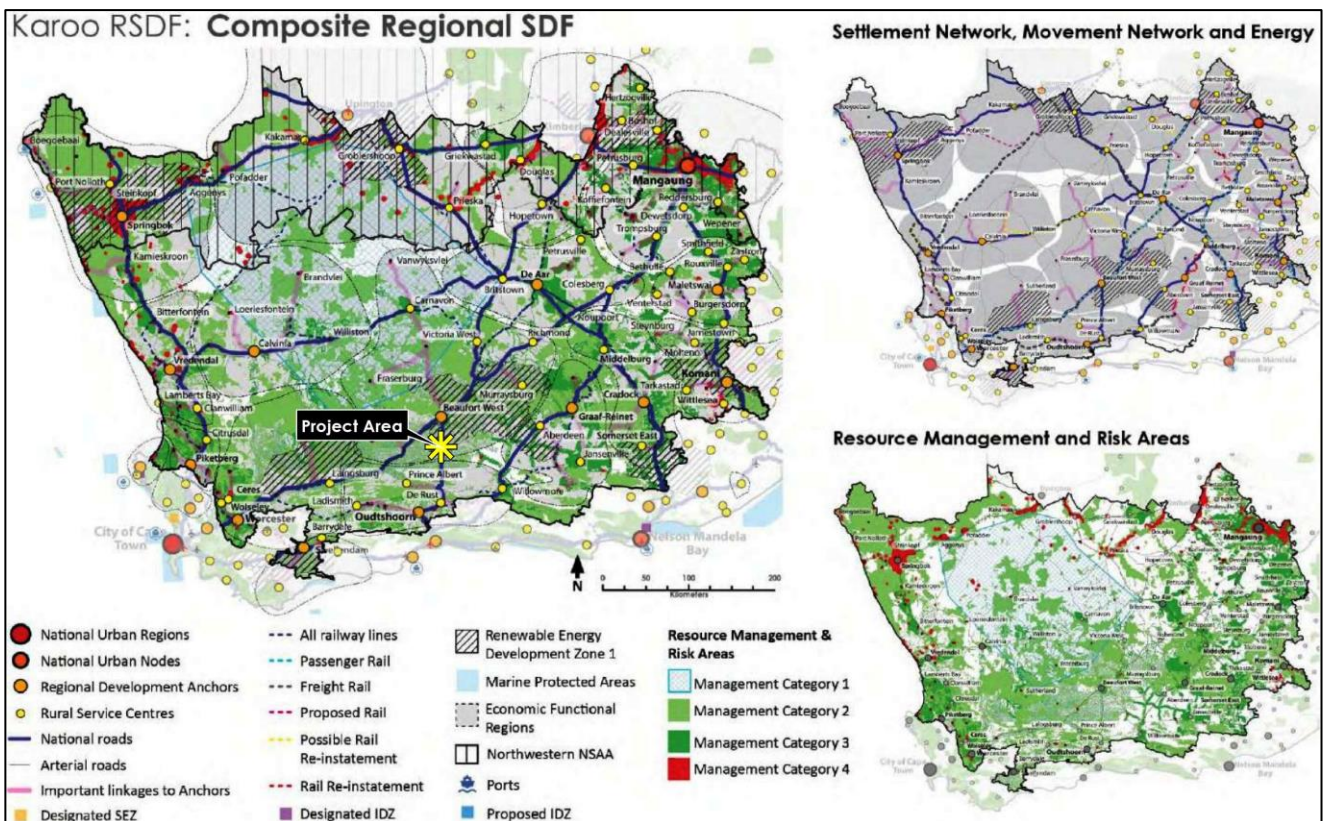
and spatial objectives :

- Support the Karoo Vision and Identity
- Provide Regional Transformation Guidance
- Prioritise Regional Heritage and Conservation
- Enable Regional Growth, Innovation and Change
- Support Regional Collaborative Action

The SDF further notes that :

The large-scale economic infrastructure base forms the macroeconomic landscape of the Region and delivers economic growth and job opportunities at a regional scale while contributing to the national and the global economy in a number of areas. The large-scale regional economic activities are, amongst others :

- Solar and wind-energy generation
- Other business and technical services in support of large scale activities, e.g. manufacturing, maintenance and repair facilities and services for solar and wind energy generators and related infrastructure, personal, legal and financial services, trade and retail, etc.



Renewable energy is identified as Catalytic Interventions with Spatial Targeting as part of the SDF implementation framework.

It is therefore clear that the Carissa WEF is in support of the general principles and objectives of the Karoo Regional SDF.

11. Provincial Policy

11.1 Western Cape Spatial Development Framework (2014) (PSDF)

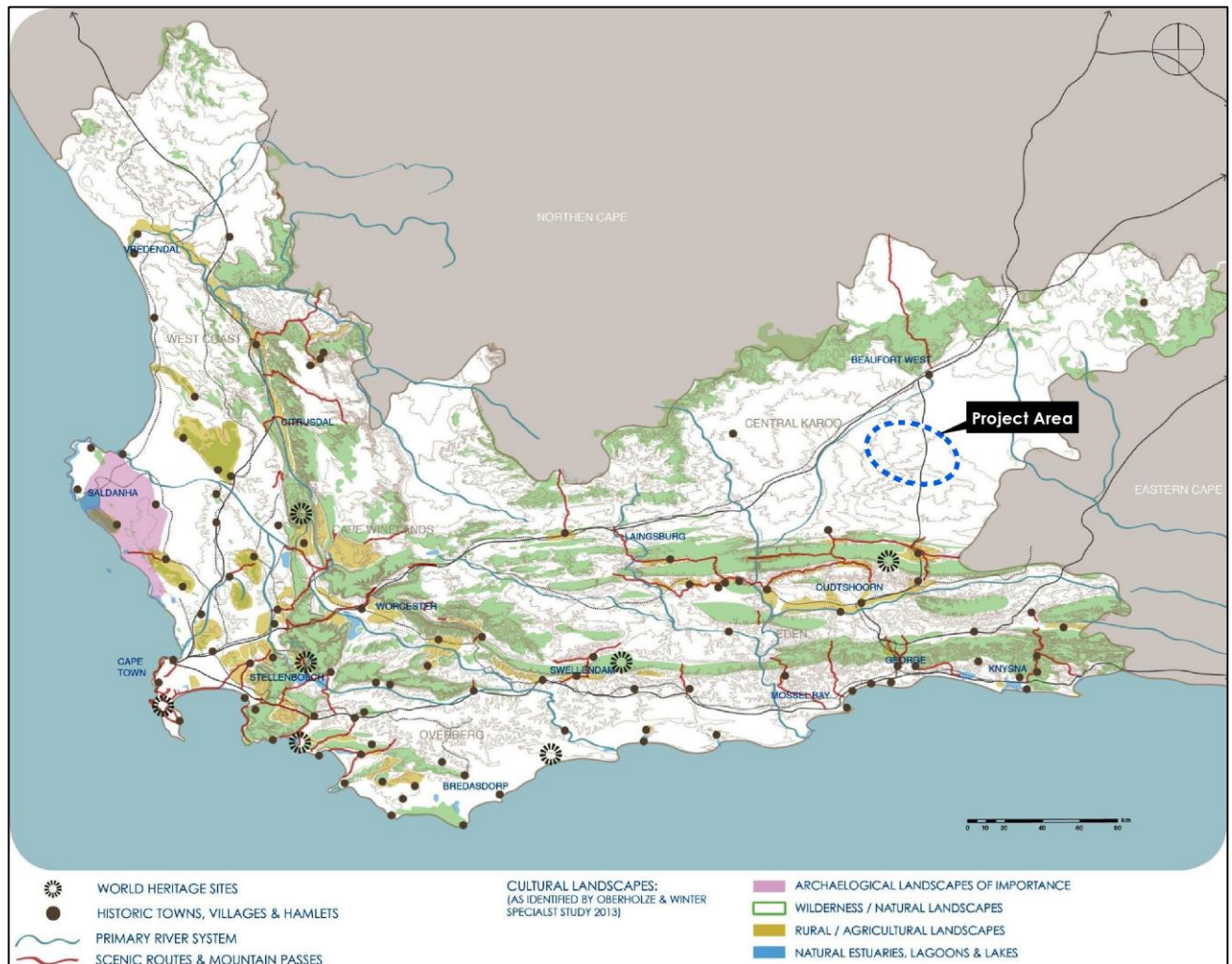
The PSDF sets out the basis for addressing the Western Cape's spatial agenda, it is a framework plan which allows functional regions or municipalities to formulate coherent spatial policies and integrated development plans, and which gives greater certainty over future development opportunities.

The Provincial Spatial Development Framework (PSDF) takes forward the NDP's spatial agenda as well as give effect to the Provincial Strategic Objectives (SPOs), which include creating economic opportunities, focusing on education, promoting accessibility, safety, inclusiveness and resource efficiency, creating wellness, liveability, inclusiveness and ensuring rural development and governance.

In terms of the PSDF, the Western Cape Government is committed to developing 'green' economy and their goal is for the province to be the lowest carbon province in the country and the leading green economic hub of the African continent. Generating energy from renewable sources (solar, wind power, biomass) is recognised in the PSDF as one of the efforts to ensure environmental sustainability. It is further acknowledged that the province has the best wind and wave energy in the country, as well as a good solar and bio-energy potential.

The following provincial spatial policies have been identified as applicable to this proposed development :

- **Spatial Policy R4: Energy** – Independent Power Producers and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) are to be supported in suitable rural locations.
- **Spatial Policy R4: Climate Change Mitigation** – Renewable energy generation should be supported at scale since it significantly mitigates climate change.
- **Spatial Policy R5: Safeguard cultural and scenic assets** – The SDF identifies priority focus areas proposed for conservation or protection include landscape under pressure of large-scale infrastructural developments such as wind farms, solar energy facilities, transmission lines and shale gas development in the Central Karoo. The Karoo National Park north of Beaufort West is a protected landscape, and the mountain passes and 'poorts' are of scenic and heritage significance. The PSDF specifically highlights the importance of amongst others the Molteno pass (R381) in the Nuweveld mountain range.



Western Cape SDF

11.2 Western Cape Land Use Planning Guidelines for Rural Areas (2019)

The PSDF (2014) called for the review of the Draft Western Cape PSDF Rural Land Use Planning and Management Guidelines (2009) to be reviewed and updated to support and guide the implementation of the provincial agenda in rural areas. This Guideline is thus a greater refinement of the 2014 PSDF.

The objectives of the Rural Areas Guideline are to :

- Promote sustainable development in appropriate rural locations throughout the Western Cape and ensure the inclusive growth of the rural economy;
- Safeguard priority biodiversity areas and the functionality of the province's life supporting ecological infrastructure and ecosystem services (i.e. environmental goods and services);
- Maintain the integrity, authenticity and accessibility of the Western Cape's significant farming, ecological, coastal, cultural and scenic rural landscapes, and natural resources;
- Assist Western Cape municipality to plan and manage their rural areas more effectively, and to inform the principles of their zoning schemes and spatial development framework in a pro-active manner;
- Provide clarity to all role players and partners (public and private) on the type of development that is appropriate beyond the current built-up areas, suitable locations where it could take place and the desirable form and scale of such development;

- Be viewed as a gender mainstreaming tool which will move the Western Cape further along the trajectory towards the achievement of equality, particularly the youth and gender equality imperatives in rural land use planning.

▣ **Infrastructure Installations**

It is acknowledged in the guidelines that renewable energy installations will by its space extensive nature, be located outside urban areas.

The majority of the implementation guidelines have been incorporated in the new Beaufort West Standard Zoning Scheme By-Law (2020). The following is additional :

- Installations to be located on previously disturbed terrain (where possible), or land of low biodiversity or agricultural value;
- Installations should not interfere with or negatively impact on existing/planned agriculture;
- Only essential installations to be accommodated inside Agriculture;
- Avoid slopes of more than 12% and if not possible, erosion must be controlled.

▣ **Development Applications**

Guidelines are included to guide authorities with land use decisions in rural areas and to enable them to impose suitable conditions. These are summarised below :

- Consider the compatibility of the proposed land use activity given the Biodiversity and Spatial Planning Category;
- Preserve unique or high value agricultural land, and do not compromise existing farming activities;
- Ensure existing and future mineral resources are not compromised;
- Consider the impact on cultural and scenic landscapes;
- Ensure the development does not unduly expand the Municipality's reticulation networks;
- Ensure the proposal does not impact negatively on the authenticity of rural landscapes;
- Location of the Carissa WEF supports the general principles of the Western Cape Land Use Planning Guidelines for Rural Areas (2019).

12. District & Municipal Policy

12.1 Central Karoo District Municipality IDP

The Integrated Development Plan for the Central Karoo District Municipality (DMIDP) includes three category B municipalities within the district municipality, namely Beaufort West, Laingsburg and Prince Albert. Beaufort West is by far the largest town and serves as the administrative centre of the district.

Each of the three towns play a role in the regional economy with little change over time in the nature and extent of these roles. However, the introduction of renewable energy generation and the Square Kilometre Array project in the greater Karoo region, as well as possible exploration for shale gas, will add value to the GDP within certain economic sectors and by implication change the composition and character of the towns.

Wind and Solar energy projects are identified as an opportunity in the district municipality. The district has favourable conditions for renewable energy generation which is seen as a strategic local resource which gives a competitive advantage to the district municipality. It is acknowledged that the Central Karoo can contribute to a decrease in emissions for the country as a whole by harnessing the ample opportunities for wind and solar projects, thereby also addressing climate change.

12.2 Central Karoo District Municipality SDF (2019)

The Beaufort West Local Municipality is situated in the Central Karoo District Municipal area. The SDFs for these areas present the spatial vision and objectives for development implementation, specifically in relation to the Carissa WEF.

The spatial vision for Central Karoo DM :

Working Together in Development and Growth
in order to ensure that the Central Karoo becomes a place where economic growth, social development and sustainability is achieved whilst maintaining the rural character, as well as embracing and developing the diversity of the communities.

▣ District wide spatial concept :

The **spatial concept for the district municipality** focusses on sustainable development, resilience and partnerships.

The four strategies of the municipal wide spatial concept are :

1. A region that **protects the environment, enhances resilience and capitalises** on and honour's the Karoo charm in support of a vibrant people and economy.
2. **Improve regional and rural accessibility and mobility** for people and goods in support of a resilient economy.
3. **Allocate government resources, infrastructure and facilities** in a manner that uplifts and skills people and focusses on maximising impact on the most possible people, while providing a basic level of service for all.
4. **Partnership-driven governance** and administration towards improved financial and non-financial sustainability and resilience.

Municipal strategy 1 (applicable to this application) :

A resilient region is one that can adapt to and mitigate against the negative effects of climate change, increasing temperatures, reduced rainfall and the host of downstream impacts on the economy and society at large. The future vibrancy of the economy and social advances will invariably be rooted in the resilience of the natural environment to a host of negative impacts.

⇒ Policies in support of this strategy (applicable to this application) :

Support and promote the renewable energy :

The Karoo region is blessed with significant solar and wind energy – the prerequisites for successful renewable energy projects. The Central Karoo should leverage these assets to encourage Independent Power Producers to locate in the region, by making and keeping the Central Karoo a well-managed and desirable place to locate.

National government has identified preferred areas or Renewable Energy Development Zones (REDZ's), as well as identified areas for electricity generation. Notwithstanding this, there are vast areas of the Central Karoo outside of these REDZ's that hold potential to generate renewable energy. These areas should not be completely ignored in supporting the future energy resilience of the province and country.

Policy Guidelines :

- Actively seek out green energy projects to be located in the region.
- Put in place incentives to encourage green energy operators to locate in the Central Karoo.
- Lobby the National Department of Mineral Resources and Energy to expand the Renewable Energy Development Zones extensively within the Central Karoo, in order to promote renewable energy opportunities.
- The Carissa WEF project supports the principles as contained in the Central Karoo DM Spatial Development Framework.

12.3 Beaufort West Municipality Integrated Development Plan

The mission statement for the Beaufort West Municipality, as contained in the IDP is :

To reflect the will of the South African people as reflected in the Constitution and by Parliament:	
Service Delivery:	To provide excellent services to the residents of Beaufort West Municipality
Growing the economy:	To implement infrastructure to grow the economy and create jobs;
Staff:	To have an equipped, skilled and motivated staff establishment;
Well-run administration:	establish a sound, efficient and effective administration for the Municipality;
Financial Sustainability:	Collecting all debtors and paying creditors in time;
Sport centre:	To become the sport and recreational mecca of the Karoo, creating harmony and unity
Safe place:	To create a crime-free, safe and healthy environment
Reduce Poverty:	To reduce poverty and promote the empowerment of women, youth and people living with disabilities

The municipal strategic focus areas are the priority areas of the municipality with the following priorities:

- Basic Service Delivery and Infrastructure Development
- Economic Development
- Institutional Development and Municipal Transformation
- Financial Viability and Management
- Good Governance and Community participation

The proposed Carissa WEF supports the Municipality's strategic focus areas, insofar as job creation, economic development, sustainability and support for National and Provincial programmes of concern.

12.4 Beaufort West Municipality Spatial Development Framework

The Municipal Spatial Development Framework (MSDF) for Beaufort West links to the objectives of the IDP and becomes the spatial representation of the IDP objectives. The MSDF is linked with other spatial policies, including the PSDF and the DMSDF.

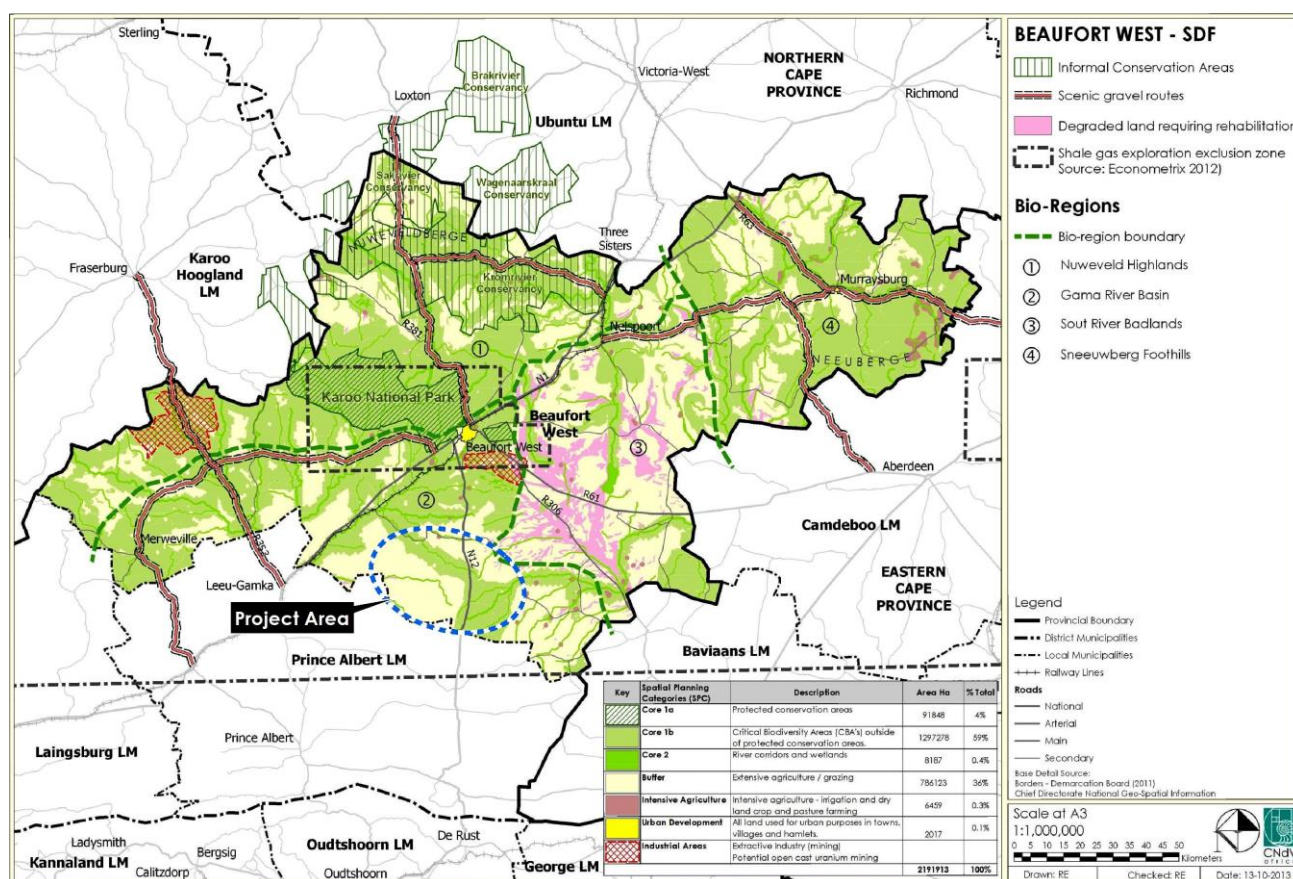
■ Bio-Regions

The SDF identified four bio-regions that can be distinguished in terms of the natural environment and economy. The bio- regions are:

- Nuweveld Highlands
- Gamka River Basin
- Sout River Badlands
- Sneeuwberg Foothills

The Carissa WEF falls within the Gamka River Basin Bio-region.

The SDF states that the Gamka River Basin bio-region has fairly good potential for wind and solar energy projects.



- The SDF promotes major infrastructure projects such as large wind energy generation projects in general and sets out siting principles and development guidelines for wind energy generation projects.
- The SDF recommends that solar and wind projects should be promoted in the south-west of the municipality. Renewable energy projects are not specifically excluded or prohibited in any of the other bio-regions.

The SDF makes certain recommendations and provides guidelines for the siting of Renewable Energy Projects as well as provisions for the design of facilities, which are summarised below. These recommendations should be considered as guidelines when applications are considered and is quite different from the Zoning Scheme regulations (which must either be complied with or departed from).

▣ **Siting Principles in the SDF**

- Slopes affect wind potential, visibility, road layout design and access, soil erosion and stability, tower foundation design and potential for re-vegetation. All of these need to be considered when selecting a site.
- Geological stability is required to carry the large loads the turbines impose on foundations.
- Soil and rainfall both need to be taken into consideration to avoid soil erosion and enable re-vegetation.
- Hydrology and groundwater issues which may influence siting include river systems and wetlands.
- Vegetation Assessment, including disturbed or alien vegetation, indigenous, endemic and rare species, and if the site is affected by CBA's.

▣ **Wind Farm Design Guidelines**

- Wind turbine layout: minimum placement distance between turbines should be twice the tower height plus half the rotor diameter) with a similar hub height and a regular spacing;
- Internal Roads: minimum overall road lengths and minimum road widths will depend on the turbine specifications. Align roads on gentle gradients to reduce rainwater run-off velocity, avoid crossing steep areas (i.e. Slopes >40% hard surfacing to be avoided);
- Substations and powerlines within the site should preferably be buried and follow road alignments wherever possible.

▣ **Beaufort West Zoning Scheme Regulations**

- The Beaufort West Zoning Scheme Regulations provide parameters for implementation of the Renewable Energy Projects, which is slightly different from the MSDF guidelines.
- The Carissa Wind Energy Facility project will adhere to the provisions of the Beaufort West Zoning Scheme Regulations.

The MSDF provides guidelines only. A detailed scientific site assessment process, supported by various specialist studies, has been conducted and based on this detailed assessment, it is expected that the Department of Forestry, Fisheries & the Environment will issue a positive Environmental Authorisation for the project.

It is further noted that the Beaufort West MSDF is currently under review and it is expected that the Renewable Energy Guidelines will be revised to align with more recent siting principles.

12.5 Conclusion : Consistency with the MSDF

- The Gamka River Basin bio-region is specially identified as having fairly good potential for both wind and solar energy projects.
- The development proposal makes use of natural resources (i.e. wind) which will contribute to energy for the local and national economy, whilst taking into consideration all environmental sensitivities on the site.
- The site was selected based on it being setback sufficiently from the Karoo National Park (and its expansion plan).
- The layout and design of the facility follows the guidelines for renewable energy installations in that it will not be situated on land of high agricultural value, and it will not interfere with any agricultural activities.
- Various employment and other economic development opportunities (i.e. local workforce, local spending etc.) will be created with this project.
- The Visual Impact Assessment Reports concludes that :

"Despite being situated in the visually sensitive and tranquil Karoo landscape, the specific area within the 25km PAOI does not attract significant tourist attention due to its aesthetically pleasing yet unremarkable scenery. Most tourists pass through the region during peak holiday seasons, en route to more popular destinations in the Western Cape Province.

Considering all positive factors of such a development including economic factors, social factors and sustainability factors, especially in a semi-arid country, the visual impact of this proposed development might not outweigh the positive impacts, and is suggested that the development commence, from a visual impact point of view. The impact is deemed acceptable despite the high impact. Any of the grid connection alternatives can be approved."

- There are several area of CBA b1 located within the Carissa site. The Terrestrial Impact Assessment Report, which includes ecology, wetlands, fauna and flora and assesses the potential impact and the associated disturbance of vegetation on the ecology and biodiversity, concludes that :

"Based on the scoping assessment it can be said that the portions of the PAOI made up of natural habitats are sensitive with a number of SCC expected for the area. This assumption is based on the presence of a CBA 1, ESA 1 and ESA 2, along with the inherently sensitive nature of Karoo ecosystems.

The PAOI has been altered, albeit limited, both currently and historically. Historically, grazing from livestock and mismanagement has led to (limited) deterioration of the area. Most areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by development

It is the opinion of the specialist that the layout is acceptable and may be considered favourably for approval by the Competent Authority."

- The MSDF indicates that substations and powerlines within the site should preferably be buried and follow road alignments wherever possible.
- Powerlines between turbines follow existing roads and will be buried (as cables) except in instances where crossing natural features such as rivers and other environmental considerations make it impossible to bury the lines. The Operations & Maintenance Building, Substations and Switching Stations will be clustered with the BESS and has been positioned in a manner which reduces the visual impact. Burying these facilities and buildings will have a much greater adverse impact on the environment and will have long-term maintenance cost implications for the project.

13. Environmental Impact Assessment

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations (4 December 2014, Government Notice (GN) R982, R983, R984 and R985, as amended), various aspects of the proposed development may have an impact on the environment and are considered to be listed activities. These activities require authorisation from the National Competent Authority (CA), namely the DFFE, prior to the commencement thereof.

Blue Crane Environmental (Pty) Ltd has been appointed to undertake the Scoping and Environmental Impact Assessment (S&EIA) Process for the proposed development. Activities required for the development of the WEF which are listed under Listing Notice 1, 2 and 3 (GN.R. 327, 325 and 324) implies that the development could potentially have a significant impact on the environment that will require mitigation. A thorough assessment process is required as described in Regulations 21-24 of the EIA Regulations 2014, as amended, to obtain Environmental Authorisation (EA).

In accordance with the EIA Regulations, 2014 (as amended), the assessment of potential environmental and social impacts and benefits associated with any proposed activity that requires EA dictates that specialist, where relevant, depending on the nature and scale of the activity be appointed. As a result, several specialists have been appointed to adequately identify and assess the potential impacts and benefits associated with the Proposed Project.

Blue Crane Environmental consultants is the responsible EAP and has relied on inputs from a selected team of highly experienced specialists and multi-disciplinary practitioners to execute the project in a professional and unbiased manner.

Refer to Annexure 8 : Final Basic Assessment Report (11.2024) (extract only)

13.1 Project Team

The independent Project Team that were involved in the Environmental Assessment process are :

Discipline	Company
Environmental Assessment Practitioner	Blue Crane Environmental (Pty) Ltd
Terrestrial Biodiversity Impact Assessment	The Biodiversity Company
Aquatic Biodiversity Impact Assessment	Biosphere
Avifaunal Impact Assessment	Holland & Associates
Bat Assessment	Animalia
Soil and Agricultural Impact Assessment	Johann Lanz Consulting
Visual Impact Assessment	Donaway Environmental Consultants
Social Impact Assessment	Donaway Environmental Consultants
Noise Impact Assessment	EARES
Heritage Impact Assessment	Ubique
Paleontological Impact Assessment	Banzai Environmental
Traffic Impact Assessment	BVi Consulting Engineers
Geotechnical Assessment	Outeniqua Geotech
Risk Assessment	ISHECON
Town Planning Consultant	Urban Dynamics EC

13.2 Summary of Cumulative Assessment

The EIA Regulations, 2014 (as amended) determine that cumulative impacts, "*in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.*"

A geographic area must be determined within which the effects of the potential cumulative impacts will be relevant and experienced, and therefore the spatial boundary within which the cumulative impact assessment will be undertaken. The spatial boundary evaluated in this cumulative assessment generally includes an area of a 30 km radius surrounding the proposed development.

The tables provide a Summary of the cumulative impact significance for the Carissa Wind Energy Facility within the project site. Note that the table below is a summary only and the Final Environmental Scoping Report and Specialist Studies should be consulted.

Geological Environment

Table 9.2: Soil Degradation by Disturbance

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
Soil degradation by disturbance, removal, mixing, compaction, etc due to the construction of infrastructure	Before mitigation	Negative	1	4	2	2	1	1	3	33	Medium (29-50)	Yes	Yes
	After mitigation	Negative	1	4	2	2	1	1	1	11	Low (6-28)		
Mitigation: <ul style="list-style-type: none">Minimise excavations and disturbance areas.Rehabilitate topsoil and vegetation around site a construction.													

Table 9.3: Soil Degradation Due to Pollution

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
Soil degradation due to pollution by contaminants used on site during construction (fuel, oil, chemicals, cement)	Before mitigation	Negative	1	3	2	2	1	1	3	30	Medium (29-50)	Yes	Yes
	After mitigation	Negative	1	3	2	2	1	1	1	10	Low (6-28)		
Mitigation: <ul style="list-style-type: none">• Provide contamination prevention systems on site.• Control use and disposal of potential contaminants or hazardous materials.													

Table 9.4: Erosion by Wind and/or Water of Loosened Soil

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
Erosion by wind and/or water of loosened soil in construction areas	Before mitigation	Negative	1	3	3	2	2	2	3	39	Medium (29-50)	Yes	Yes
	After mitigation	Negative	1	3	3	2	1	1	1	11	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">Minimise size of the construction footprint.Avoid work in or near watercourses where possible.Restrict activity outside of construction.													

Table 9.5: Degradation of Watercourses During

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
Degradation of watercourses due to siltation (silt-loading) due to erosion from denuded construction areas	Before mitigation	Negative	2	3	3	2	2	2	3	42	Medium (29-50)	Yes	Yes
	After mitigation	Negative	1	2	3	2	1	1	1	10	Low (6-28)		
Mitigation:													
• Install anti-erosion measures such as silt fences, geosynthetic erosion protection, and/or flow attenuation along watercourses below construction sites.													

Table 9.6: Dust Pollution During the Construction Phase

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
Dust pollution due to wind erosion from denuded construction areas	Before mitigation	Negative	2	3	3	2	2	2	2	28	Low (6-28)	Yes	Yes
	After mitigation	Negative	1	2	3	2	1	1	1	10	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">• Apply dust control measures such as straw bales or dampen dusty denuded areas.• Minimise number of disturbance areas at any one time.													

Table 9.7: Reduction in the Extraction of Non-Renewable Energy Sources

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated?	Is the impact acceptable?
A reduction in the extraction of non-renewable energy sources, such as coal, uranium, etc	Before mitigation	Positive	4	4	1	1	3	4	4	68	High (51-73)	Yes	Yes
	After mitigation												
Mitigation:													
• N/A													

Avifauna Impacts

Table 9.8: Cumulative Avifauna Impacts

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Displacement from Disturbance; Displacement from Habitat Loss; Mortality from Collisions with wind turbines; Mortality from Collisions with overhead power lines; Mortality from Electrocutions on overhead power lines and electrical infrastructure	Impact in isolation	Negative	1	3	2	2	3	4	3	45	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	3	3	2	2	3	3	3	48	Medium (29-50)		
Mitigation:													
<ul style="list-style-type: none">Competent Authority to ensure only projects are authorised that are practically mitigatable to an acceptable level, and that do not lead to unacceptable negative impacts, including cumulative impacts, and to ensure the correct implementation of authorised Environmental Management Programmes through compliance audits and enforcement.													

Impacts on Bats

Table 9.9: Destruction of Bat Roosts During Construction Pre-Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Destruction of bat roosts during construction pre mitigation	Impact in isolation	Negative	1	3	4	3	1	3	3	45	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	2	3	4	3	1	3	3	48	Medium (29-50)		
Mitigation:													
<ul style="list-style-type: none">Adhering to the bat sensitivity map as a mitigation to be outlined in the EMPr, is adequate.Additionally, if undiscovered bat roosts are encountered during construction, the Environmental Compliance Officer (ECO) on site must be notified immediately and a bat specialist consulted to advise the appropriate action.													

Table 9.10: Destruction of Bat Roosts During Construction Post Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Destruction of bat roosts during construction post mitigation	Impact in isolation	Negative	1	1	4	3	1	2	1	12	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	2	1	4	3	1	2	1	13	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">Adhering to the bat sensitivity map as a mitigation to be outlined in the EMPr, is adequate.Additionally, if undiscovered bat roosts are encountered during construction, the Environmental Compliance Officer (ECO) on site must be notified immediately and a bat specialist consulted to advise the appropriate action.													

Table 9.11: Foraging Habitat Loss During Construction Pre-Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Foraging habitat loss during construction pre mitigation	Impact in isolation	Negative	1	3	4	3	1	3	2	30	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	2	3	4	3	1	3	2	32	Medium (29-50)		
Mitigation:													
<ul style="list-style-type: none">Adhering to the bat sensitivity map as a mitigation to be outlined in the EMPr, is adequate.													
<ul style="list-style-type: none">Additionally, keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles. Damaged areas should be rehabilitated by an experienced vegetation succession specialist after construction.													

Table 9.12: Foraging Habitat Loss During Construction Post Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Foraging habitat loss during construction post mitigation	Impact in isolation	Negative	1	2	4	3	1	2	1	13	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	2	2	4	3	1	2	1	14	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">Adhering to the bat sensitivity map as a mitigation to be outlined in the EMPr, is adequate.Additionally, keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles. Damaged areas should be rehabilitated by an experienced vegetation succession specialist after construction.													

Table 9.13: Bat Mortalities Due to Direct Blade Impact or Barotrauma During Foraging (Not Migration) During Operation Pre-Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Bat mortalities due to direct blade impact or barotrauma during foraging (not migration) during operation pre mitigation	Impact in isolation	Negative	2	4	2	3	3	4	3	54	High (51-73)	Yes	Yes
	Cumulative impact	Negative	2	4	2	3	3	4	3	54	High (51-73)		
Mitigation:													
• Implement the Action Plan included in section 9 of the Bat Impact Assessment. The Action Plan will be included in the EMPr during the EIA phase.													

Table 9.14: Bat Mortalities Due to Direct Blade Impact or Barotrauma During Foraging (Not Migration) During Operation Post Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Bat mortalities due to direct blade impact or barotrauma during foraging (not migration) during operation post mitigation	Impact in isolation	Negative	2	2	2	2	3	3	2	28	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	2	2	2	2	3	3	2	28	Low (6-28)		

Mitigation:

- Implement the Action Plan included in section 9 of the Bat Impact Assessment. The Action Plan will be included in the EMPr during the EIA phase.

Table 9.15: Bat Mortalities Due to Direct Blade Impact or Barotrauma During Migration Pre-Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Bat mortalities due to direct blade impact or barotrauma during migration pre mitigation	Impact in isolation	Negative	3	2	2	3	3	3	3	48	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	3	2	2	3	3	3	3	48	Medium (29-50)		

Mitigation:

- Based on peak bat activity periods that will be presented by the 12-month pre-construction study for migratory bat species, curtailment must be applied to all turbines by ninety-degree feathering of blades below the manufacturer's cut-in speed, so they are exactly parallel to the wind direction thereby minimising freewheeling blade rotation as much as possible without locking the blades. This applies to the lifetime of the facility and can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated below the manufacture's cut-in speed.
- Additional mitigation (only if required): Additional curtailment or bat deterrent mitigation parameters based on climatic conditions may be presented when all bat activity data are gathered, and will be detailed in the EMPr. Such additional curtailment or bat deterrent mitigation will only be required if bat mortalities of migratory species exceed sustainable thresholds for the region, and will be limited to the applicable turbines causing the highest fatalities.

Table 9.16: Bat Mortalities Due to Direct Blade Impact or Barotrauma During Migration Post Mitigation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Bat mortalities due to direct blade impact or barotrauma during migration post mitigation	Impact in isolation	Negative	3	1	2	2	3	2	2	26	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	3	1	2	2	3	2	2	26	Low (6-28)		

Mitigation:

- Based on peak bat activity periods that will be presented by the 12-month pre-construction study for migratory bat species, curtailment must be applied to all turbines by ninety-degree feathering of blades below the manufacturer's cut-in speed, so they are exactly parallel to the wind direction thereby minimising freewheeling blade rotation as much as possible without locking the blades. This applies to the lifetime of the facility and can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated below the manufacture's cut-in speed.
- Additional mitigation (only if required): Additional curtailment or bat deterrent mitigation parameters based on climatic conditions may be presented when all bat activity data are gathered, and will be detailed in the EMPr. Such additional curtailment or bat deterrent mitigation will only be required if bat mortalities of migratory species exceed sustainable thresholds for the region, and will be limited to the applicable turbines causing the highest fatalities.

Aquatic Ecosystems Impacts

Table 9.17: Habitat Fragmentation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Habitat Fragmentation: Fragmentation of aquatic habitats due to multiple infrastructure projects in the region (Roads, transmission lines, other PV and WEF Projects)	Impact in isolation	Negative	1	1	1	1	3	2	1	9	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	3	2	2	2	3	4	3	48	Medium (29-50)		
Mitigation:													
<ul style="list-style-type: none">Establish aquatic fauna corridors to maintain connectivity between habitats.Collaborate with other project developers to coordinate aquatic habitat protection buffers.													

Table 9.18: Increased Sedimentation

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Increase Sedimentation: Combined sedimentation effects from construction activities in the area leading to degraded flow patterns and water quality	Impact in isolation	Negative	1	2	2	2	3	2	2	24	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	3	3	3	3	3	3	3	54	High (51-73)		
Mitigation:													
<ul style="list-style-type: none">Implement region wide sediment control strategies.Collaborate with local authorities and other developers to reduce cumulative sediment load in the water bodies.Monitor sediment levels and adjust mitigation measures as needed.													

Table 9.19: Disturbance to Aquatic Fauna

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Disturbance to Aquatic Fauna: Cumulative Noise & vibration from WEF and infrastructure affecting aquatic species behaviour and reproduction	Impact in isolation	Negative	1	2	2	2	3	2	2	24	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	3	3	3	4	3	3	3	57	High (51-73)		
Mitigation:													
<ul style="list-style-type: none">Implement noise reduction measures across all projects.													
<ul style="list-style-type: none">Schedule activities to avoid critical periods (breeding season) for aquatic species.Monitor aquatic fauna and species activities in the greater area.													

Table 9.20: Beneficial Habitat Restoration

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Beneficial Habitat Restoration: Opportunities for coordinated natural habitat restoration efforts across multiple decommissioned sites, leading to improved aquatic ecosystem health	Impact in isolation	Positive	2	3	2	2	2	3	3	42	Medium (29-50)	Yes	Yes
	Cumulative impact	Positive	3	2	3	2	2	4	4	64	High (51-73)		
Enhancement:													
<ul style="list-style-type: none">Collaborate with other stakeholders to create a regional aquatic habitat restoration plan.Monitor the success of restoration efforts and share best practices with other stakeholders.Leverage combined resources for more extensive and effective restoration projects.													

Social Impacts

Table 9.21: Cumulative Impact from Employment, Skills and Business Opportunities

Nature of the Impact			Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Cumulative impact from employment, skills and business opportunities	Impact in isolation	Positive	2	2	1	1	3	2	3	33	Medium (29-50)	Yes	Yes		
	Cumulative impact	Positive	3	4	1	1	3	2	4	56	High (51-73) 50				
Enhancement:															
• The establishment of several renewable power projects in the area has the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will be enhanced if local employment policies are adopted, and local services providers are utilised by the developers to maximise the project opportunities available to the local community.															

Table 9.22: Cumulative Impact with Large Scale In-Migration of People

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Cumulative impact with large scale in-migration of people	Impact in isolation	Negative	2	2	1	1	2	3	2	22	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	2	3	1	1	3	4	4	56	High (51-73)		
Mitigation:													
<ul style="list-style-type: none">Develop a recruitment policy / process (to be implemented by contractors), which will source labour locally.Work together with government agencies to ensure service provision is in line with the development needs of the local area.Form joint ventures with community organisations, through Trusts, which can provide local communities with benefits, such as employment opportunities and services.													

Noise Impacts

Table 9.23: Cumulative Noise Impact

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Cumulative noise impact (night-time operation of wind turbines)	Impact in isolation	Negative	1	4	1	2	3	3	3	42	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	1	2	1	2	3	3	2	24	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">As per operational mitigation measures.Applicant to discuss and co-ordinate with the developer of the Koup 1 and Koup 2 WEFs.													

Cultural Heritage and Palaeontology

Table 9.24: Heritage Impact All Phases Activities

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Heritage Impact all phases activities	Impact in isolation	Negative	2	3	4	4	3	1	2	34	Medium (29-50)	Yes	Yes
	Cumulative impact	Negative	2	2	2	2	3	1	2	24	Medium (29-50)		
Mitigation: <ul style="list-style-type: none">• Demarcate areas to be developed.• Avoid all sensitive environmental features.													

Visual Impacts

Table 9.25: Visual Impact – Cumulative

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Cumulative visual impacts of proposed projects.	Impact in isolation	Negative	2	4	4	3	3	4	3	60	High (51-73)	Yes	Yes
	Cumulative impact	Negative	3	4	4	4	3	4	4	84	Very High (74-96)		
Mitigation:													
• Retain/re-establish and maintain natural vegetation immediately adjacent to the development.													

Traffic Impacts

Table 9.26: Cumulative Impacts Associated with the Development of the Carissa WEF

Nature of the Impact	Status		Extent	Probability	Reversibility	Irreplaceability	Duration	Cumulative Effect	Magnitude	Impact Significance	Impact Rating	Can impact be mitigated / enhanced?	Is the impact acceptable?
Overall increase in traffic during the lifetime of the different renewable energy facilities, located within a 30 km radius from the Carissa Wind Energy Facility.	Impact in isolation	Negative	2	3	1	1	3	1	1	11	Low (6-28)	Yes	Yes
	Cumulative impact	Negative	3	3	1	1	3	2	1	13	Low (6-28)		
Mitigation:													
<ul style="list-style-type: none">• All vehicles must be roadworthy, and drivers must have the relevant licenses for the type of vehicles they are operating.• All vehicle drivers need to strictly adhere to the rules of the road and all renewable energy facilities need to adhere to specific mitigation measures set out in terms of road safety and traffic.													

13.3 Overall Conclusion of the Scoping Report

The final Scoping Report was undertaken with the main aim of identifying the potential impacts that may occur with the development of the proposed Carissa WEF. The aim of the Scoping Phase has been to scope out the potential impacts that may be associated with the development, which are to be further assessed and refined during the EIA Phase, should Acceptance of the Scoping Phase and Plan of Study be granted by the DFFE.

The development of a wind energy facility on several farm portions located within the Beaufort West and Prince Albert Local Municipalities may potentially result in both negative and positive environmental impacts that may need to be mitigated to ensure that the development is appropriate from an environmental perspective. The entire extent of a 1 699 ha development area, and two (02) grid connection corridor options have been assessed as part of this final Scoping Report.

Key potential environmental impacts have been identified for the development through inputs provided from independent specialists. The impacts and the significance of the impacts listed below is without the implementation of the required mitigation measures.

Construction Phase Impacts:

- Soil degradation by 1) disturbance and pollution (- Low), 2) erosion by wind (- Low), 3) degradation of watercourses (- Low).
- Impacts on avifauna including 1) displacement from disturbance (- Medium), 2) habitat loss (- High).
- Impacts on bats include 1) destruction of bat roosts & habitat loss (- Medium).
- Impact on water resources 1) changes in water flow (- High), 2) disturbance of aquatic habitats (- Low), 3) risk of spills (- Medium), 4) alteration of natural water flow (- Very High).
- Impacts on landscape 1) Visual impact during operation of WEF (- High); and visual impact during construction of the grid (- Medium).
- Social impacts including 1) creation of direct and indirect employment opportunities (+ Medium), 2) economic multiplier effect (+ Low); 3) potential loss of productive farmland (- Low); 4) Influx of jobseekers and change in population (- Medium); 5) safety and security impacts (- Medium); 6) impacts on daily and movement patterns (- Medium); 7) nuisance impacts (noise and dust) (- Medium); 8) increased risk of potential veld fires (- Medium); and 9) visual and sense of place impacts (- High).
- Impacts stemming from noise include 1) construction activity (- Medium), 2) construction related traffic at NSR (- Low), 3) daytime construction activity (- Low), 4) night-time construction (- Medium).
- Impact on cultural heritage and paleontological resources 1) construction activity near significant resources (- High), 2) loss of fossils (- High).
- Impact on transport 1) increase in traffic on external road network (- Low).

Operational Phase Impacts:

- Soil degradation by 1) disturbance and pollution (- Low), 2) erosion by wind (- Low), 3) degradation of watercourses (- Low), 4) reduction in non-renewable energy sources (+ High).
- Impacts on avifauna including 1) displacement from disturbance (- Medium), 2) turbine collisions (- High), 3) collision and electrocution with power lines (- High).
- Impacts on bats include 2) bat mortality from direct blade impact (- High).
- Impact on water resources 1) water quality & accidental spills (- Medium), 2) noise and vibration (- High), 3) increased runoff & AIP (- Medium).
- Impacts on landscape 1) visual impact during operation of the solar PV facility (- Medium); visual impact during operation of the grid (- Medium); and visual impact of lighting (- Medium).
- Social impacts including 1) direct and Indirect employment opportunities and skills development (+ Low); 2) development of non-polluting, renewable energy infrastructure (+ Medium); 3) potential loss of agricultural land (- Medium); 4) Contribution to Local Economic Development (LED) and social upliftment (+ Medium); 5) impact on tourism (+ Low); and 6) visual and sense of place impacts (- High).
- Impacts stemming from noise include 1) daytime operation (- Low), 2) night-time operation (- Medium).
- Impact on cultural heritage and paleontological resources 1) construction activity near significant resources (- Medium).
- Impact on transport 1) slight increase in traffic (- Low).

Decommissioning Phase Impacts:

- Soil degradation by 1) disturbance and pollution (- Low), 2) erosion by wind (- Low), 3) degradation of watercourses (- Low).
- Impacts on avifauna including 1) displacement from disturbance (- Medium), 2) habitat loss (- High).
- Impact on water resources 1) disturbance and sedimentation (- Low), 2) rehabilitation & restoration (+ Medium), 3) turbine removal (- Low), post-decommissioning monitoring (+ Low).
- Impacts stemming from noise include 1) decommissioning project infrastructure (- Low).
- Impact on cultural heritage and paleontological resources 1) construction activity near significant resources (- High).
- Impact on transport 1) increase in traffic on external road network (- Low).

From the independent specialist studies undertaken specific preliminary environmental sensitivities have been identified within the Development Area that will need to be avoided by the placement of the development footprint / facility layout. The areas not available for development has been confirmed following extensive specialist fieldwork and site surveys. These will however be further analysed and refined during the detailed EIA phase. The most prominent features in the landscape that need to be considered for the design of the layout are:

- The avifaunal no-go areas; and avifaunal no-turbine areas. Avifauna mitigation areas have been identified which allow for development activity to continue with the implementation of stringent mitigation measures.
- The aquatic assessment has identified and delineated several watercourses which must be avoided by the implementation of a 15 m buffer for all non-perennial tributaries and drainage lines and a 32 m buffer for the NFEPA Rivers.

- The bat assessment has identified two (02) turbines that must be micro-sited during the layout optimisation process. The blade overhang of turbine 136 intrudes approximately 5.5 m into the bat no-go sensitivity buffer. The blade overhang of turbine 17 is also intruding into the high bat sensitivity buffer.
- The following cultural heritage resources were identified which must be avoided by implementing the recommended buffers. These include:
 - A farmstead older than 60 years with associated features such as outbuildings, a possible threshing floor, a kraal, and a water canal/storage was identified near the proposed grid corridor on Portion 19 of the Farm Brits Eigendom 374. The farmhouse is outside the corridor; however, the kraal is within the corridor. A 100 m buffer/safety zone is recommended to negate the negative impact on the kraal and associated features, as this resource is located within the grid corridor.
 - A Historical period structural feature was noted on Jagerskraal 3/327. This resource is, however, older than 60 years. A 100 m buffer/safety zone is recommended to negate the negative impact on the kraal and associated features, as these resources are located within and near the grid corridor.
 - A Historical period structural feature was noted on Brits Eigendom 2/374, 25/374, 21/374, 4/374. This resource is older than 60 years. A 200 m buffer/safety zone is recommended to negate the negative impact on the kraal and associated features, as these resources are located within and near the grid corridor.
 - One graveyard was recorded within the corridor footprint on Portion 21 of the Farm Brits Eigendom 374. There are approximately 43 visible graves. It is recommended that a buffer/safety zone of 50 m should be implemented around the graves.

The large extent of the development area (i.e., 41 699 ha) results in an opportunity for the avoidance of the sensitive environmental features and areas through the careful placement of the development footprint and infrastructure layout. The Applicant will consider all environmental sensitivities during the EIA Phase and design an appropriate facility layout that is considered to be acceptable, which will be further considered and assessed by the independent specialists during the EIA Phase. The acceptability of the preferred layout for the development will also be confirmed by the relevant independent specialists as part of the EIA Report, and where required further optimisation of the layout will be undertaken accordingly.

Based on the results of the draft Scoping Report, it is confirmed that no fatal flaws are relevant to the proposed development.

Blue Crane Environmental therefore confirms the suitability of the development within the assessed development area subject to the avoidance of the identified sensitive environmental features through the careful placement of the development footprint. The recommendation is therefore that the Scoping Phase (Scoping Report) and Plan of Study for the EIA Phase be approved by the DFFE, after which the EIA Phase will commence as required in terms of Regulations 23 to 24 of the EIA Regulations, as amended.

14. Title Deed Conditions

The following title deeds are applicable to the farm portions :

Property Description	Title Deed No.
Portion 6 Louis Rust (a portion of Portion 2) of Farm Dale Ajalon No. 322	T69555/2015
Portion 3 (Nieuwefontein) (portion of Portion 2) of Farm Vlakfontein No. 325	T29164/2016
Farm Meyers Poort No. 326	T23966/2003
Portion 3 (Jagers Kraal Zuid) of Farm Jagers Kraal No. 327	T15037/2002
Portion 6 of Farm Jagers Kraal No. 327	T15038/2002
Remainder Farm Vetkoe Kraal No. 369	T25158/1992 T97247/2007
Portion 2 (Bothadale) of Farm Vetkoe Kraal No. 369	T4862/1992
Portion 3 of Farm Vetkoe Kraal No. 369 (Erf A of Farm Good Hope)	T21542/1971 T97244/2007
Remainder Farm Palmietfontein No. 370	T28867/2016
Portion 2 (Annex Nuwe Plant) of Farm Palmietfontein No. 370	T45650/1996 T97248/2007
Remainder Portion 1 (Riet Fontein) of Farm Brits Eigendom No. 374	T94038/2002
Remainder Portion 2 (Amandel Hoogte) of Farm Brits Eigendom No. 374	T28910/1985
Remainder Portion 8 Amos Skuur (a portion of Portion 1) of Farm Brits Eigendom No. 374	T94038/2002
Portion 12 (a portion of Portion 8) of Farm Brits Eigendom No. 374	T94038/2002
Portion 14 (a portion of Portion 1) of Farm Brits Eigendom No. 374	T94038/2002
Remainder Portion 16 (a portion of Portion 7) of Farm Brits Eigendom No. 374	T94038/2002
Portion 19 (Nuwe Plant) (portion of Portion 2) of Farm Brits Eigendom No. 374	T45650/1996 T97248/2007
Portion 20 (Libertyn) (portion of Portion 2) of Farm Brits Eigendom No. 374	T43502/2021
Remainder Farm Kaffirs Kraal No. 380	T221/2003 T97249/2007
Portion 6 (Welgevonden) of Farm Kaffirs Kraal No. 380	T9135/1985 T97246/2007

Conveyancing Certificates confirm that there are no restrictive conditions in the Title Deeds that need to be removed to enable implementation of the Wind Energy Facility.

Existing electricity infrastructure and other servitudes will be honoured by the proposed development and not be impacted on.

Refer to Annexure 4 : Title Deeds

Refer to Annexure 5 : Conveyancing Certificates

15. Department of Agriculture, Land Reform & Rural Development (DALRRD)

The subject land portion is currently zoned for agricultural purposes and is classified as agricultural land in terms of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970) (SALA).

An application for consent to utilise the farm portion for Renewable Energy purposes was submitted to DALRRD and the Western Cape Department of Agriculture for comment and support.

A detailed Agro-Ecosystem Specialist Assessment has been conducted (Soil ZA, dated October 2024).

Refer to Annexure 9 : Agricultural Agro-Ecosystem Specialist Assessment (10.2024)

The report concludes as follows :

"The overall conclusion of this assessment is that the proposed development is desirable from an agricultural perspective because it offers a valuable, win-win opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to very little loss of agricultural land with no loss of future agricultural production potential.

The screening tool classifies the assessed area as ranging from low to high agricultural sensitivity. This assessment disputes some of the detail of the sensitivity classification by the screening tool. It confirms the high sensitivity rating as a result of cropping status, but only for small, isolated patches of cropland that will be avoided by the development infrastructure, anyway. It disputes a classified land capability of >6 and rates the entire assessed area as having a maximum land capability of 6.

The climate is classified as arid with a mean annual rainfall of 157 mm and evaporation of 1474 mm. Climate is therefore the limiting factor for land capability, regardless of the soil and terrain capability, although shallow, rocky soils are an additional limitation. Moisture availability is very limiting to any kind of agricultural production, including grazing and is completely insufficient for rain-fed crop production. The climate constraints mean that the site has very low agricultural potential and its agricultural use is limited to grazing only.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from the footprint of a development. In the case of wind farms, the amount of land excluded from agriculture is so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production potential the land has, and regardless of the duration of the impact. Furthermore, wind farms have both positive and negative effects on the production potential of land, and it is the net sum of these positive and negative effects that determines the extent of the change in future production potential. The positive effects include increased financial security for farming operations; improved security; and an improved road network.

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

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

It is confirmed that the agricultural capacity of the site is extremely limited and no development will take place on cultivated or irrigated land as contemplated in Section 53 of LUPA and the Regulations.

An application has been submitted to the Western Cape Government : Environmental Affairs & Development Planning for comment in terms of Section 45 of LUPA, confirming that the proposal does not constitute a provincial development application in terms of Section 53 (1) of LUPA, read together with Section 10 of the Regulations.

16. Land Claims Commissioner (LCC)

The Commission on Restitution of Land Claims confirmed no land claims are registered against the subject properties.

Refer to Annexure 10 : Land Claims Commissioner (LCC) Confirmation

17. Secondary Consents

Permits, approvals and consents, as required in terms of related Provincial and Local legislation, applicable to renewable energy projects, will be obtained prior to project implementation.

18. Public Interest & Participation

Public participation with respect to an application for Consent Use and Long Term Lease is guided by the Beaufort West Spatial Planning & Land Use Management By-laws. The Municipality will manage the notification and participation process as per the relevant legislation and guidelines. In the unlikely event of any objections received, the professional team will respond and address these objections.

19. Conclusion

The importance of development of renewable energy projects on a global basis is undisputed. Globally, the renewable energy industry is investing billions of dollars. The role of this industry as a driver of economic growth within South Africa is seen as significant.

It is clear from the unique nature and scale of the proposed Carissa Wind Energy Facility, that it will have significant benefits to the communities of the greater Central Karoo District and will contribute significantly to the provision of renewable energy in South Africa. The importance of renewable energy, as part of the electricity generating mix in South Africa, cannot be over emphasized. The construction of the Carissa WEF, south of Beaufort West in the Western Cape, demonstrates this commitment towards renewable energy and green efficiencies.

The development of Carissa WEF has been assessed by a team of professionals and based on the outcome of the Environmental Impact Assessment Report (EIA) and specialist studies, a positive Environmental Authorisation by the Department of Forestry, Fisheries & the Environment is expected shortly.

The following are key aspects to be highlighted from this submission :

- Renewable energy has been identified and supported through various Government Policies and Directives as priority drivers for economic development.
- The Environmental Impact Assessment process confirms the impacts are acceptable and can be mitigated.
- Implementation of the WEF will significantly contribute to local economic development and job creation possibilities.
- The principles of the Spatial Planning and Land Use Management Act and Western Cape Land Use Planning Act are supported.
- Beaufort West and Central Karoo SDFs acknowledged the potential for Renewable Energy generation and promotes renewable energy implementation.
- The development proposal is consistent with the applicable policy and National, Provincial, District and Local Spatial Development Frameworks, as contemplated in Section 42 of SPLUMA.
- Implementation of the project will support National Governments targets for renewable energy, including targets identified in the White Paper and supporting policy and legislation.
- The development will be subject to permitting requirements from all relevant Departments.
- The various specialist studies conducted confirmed minimal impact or impact with mitigating factors.
- No impact on agricultural production.
- The permanent development footprint will only cover a small portion of the overall farm area (approximately 212 ha).
- Construction, maintenance and operation phases will be strictly monitored through implementation of the Environmental Management Programme (EMPr).
- Implementation of the Carissa Wind Energy facility will contribute to local economic development and job creation possibilities.
- The principles of the Spatial Planning and Land Use Management Act are supported.
- The project will have significant socio economic benefits on a local and national level.
- The employment opportunities associated with the Carissa Wind Energy Facility is approximately:
 - 1 500 during Construction phase and
 - 100 during the Operational phases

It is therefore recommended from a planning point of view that this application, as outlined in the application, be supported and approved.