

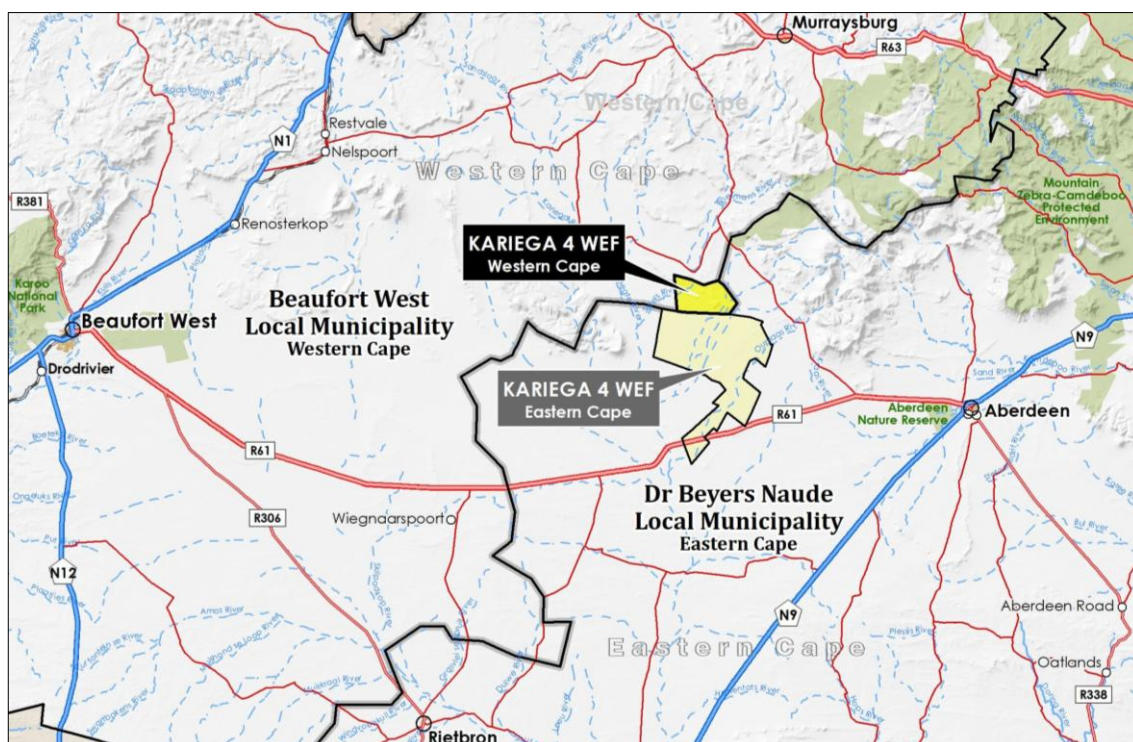
Kariega 4 Wind Energy Facility

Application for :

- Consent Use : Renewable Energy Structures
- Long Term Lease Areas
- Exemption of Servitudes

on

- The Remainder of the Farm Sarels Rivier No. 141



Report Number : 1927E/K4/W/04

July 2026

Prepared by :

Johan van der Westhuysen



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

Prepared for :

Kariega Wind Farm (Pty) Ltd

2nd Floor, Great Westerford,
240 Main Road, Rondebosch, 7700

Report Title	Kariega 4 Wind Energy Facility Application for : • Consent Use : Renewable Energy Structures • Long Term Lease Areas • Exemption of Servitudes on The Remainder of the Farm Sarels Rivier No. 141
Report Number	1927E/K4/W/03
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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	

Prepared For	Kariega Wind Farm (Pty) Ltd	
General Email Address	info@anthem.co.za	
Contact Person	Michelle Bowden	Jaana-Maria Ball
Contact Number	082 308 8535	083 650 5489
Contact Email Address	Michelle.Bowden@anthem.co.za	jaana-maria.ball@anthem.co.za

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10. Final Basic Assessment Report (September 2024) (**extract only**)
11. Agricultural Compliance Statement
12. Land Claims Commissioner (LCC) Confirmation
13. Department of Agriculture Letter of No Objection
14. Department of Mineral Resources & Energy (DMRE) Approval
15. Applicant SACPLAN Registration : Johan van der Westhuysen

Note : All Specialist Studies can be made available on request

1. The Applicant

Urban Dynamics Eastern Cape (UDEC) has been commissioned by Kariega Wind Farm (Pty) Ltd, on behalf of the owners of various farm portions, east of Beaufort West (Eastern Cape and Western Cape), to prepare and submit an application to obtain the necessary development rights to develop a wind farm and associated infrastructure for the generation of renewable energy, known as the Kariega 4 Wind Energy Facility (WEF).

Refer to Map 1 : Regional Locality

Refer to Annexure 4 : Power 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 undertaken will enable the Municipality to take an informed decision and grant the required development rights to implement this WEF project.

2. The Project & Location

Kariega Wind Farm (Pty) Ltd plans to develop, construct and operate a Wind Energy Facility (WEF) approximately 90 km east of Beaufort West in the Eastern Cape and Western Cape Provinces, known as the Kariega 4 Wind Energy Facility. The Kariega 4 WEF proposed access points will be directly and indirectly from the R61, DR02310, DR2386, DR2390, OP9219, OP9218, MR00599, MN50195 and MN50198, as indicated, between Aberdeen and Beaufort West.

The project site is situated in the Beaufort West Local Municipality (LM) and Dr Beyers Naude Local Municipality which forms part of the Central Karoo District Municipality (DM) in the Western Cape and Sarah Baartman District Municipality (DM) in the Eastern Cape, respectively.

The Kariega 4 WEF, although situated in 2 municipal areas, will be managed as a single wind farm.

The proposed Kariega 4 Wind Energy Facility will include up to 42 wind turbines (27 in Dr Beyers Naude LM and 15 in Beaufort West LM) and the following support infrastructure in the Beaufort West LM :

- Temporary Laydown / Assembly Areas at Turbines
- On-site Substation, Operations & Maintenance Buildings (± 1 ha)
- Eskom Switching Station Servitude Area (± 1 ha)
- Battery Energy Storage System (BESS) (± 5 ha)
- Construction Laydown Area (± 1 ha)
- Site Camp (± 1 ha)
- Batching Plant & Stockpile Areas (± 0.5 ha) and
- Internal Access Roads & Powerline Servitudes (20 m).

The project has an estimated generation capacity of up to 420 MW.

Project detail and scale are outlined in detail under Paragraph 4.4 of this report.

Refer to Map 1 : Regional Locality

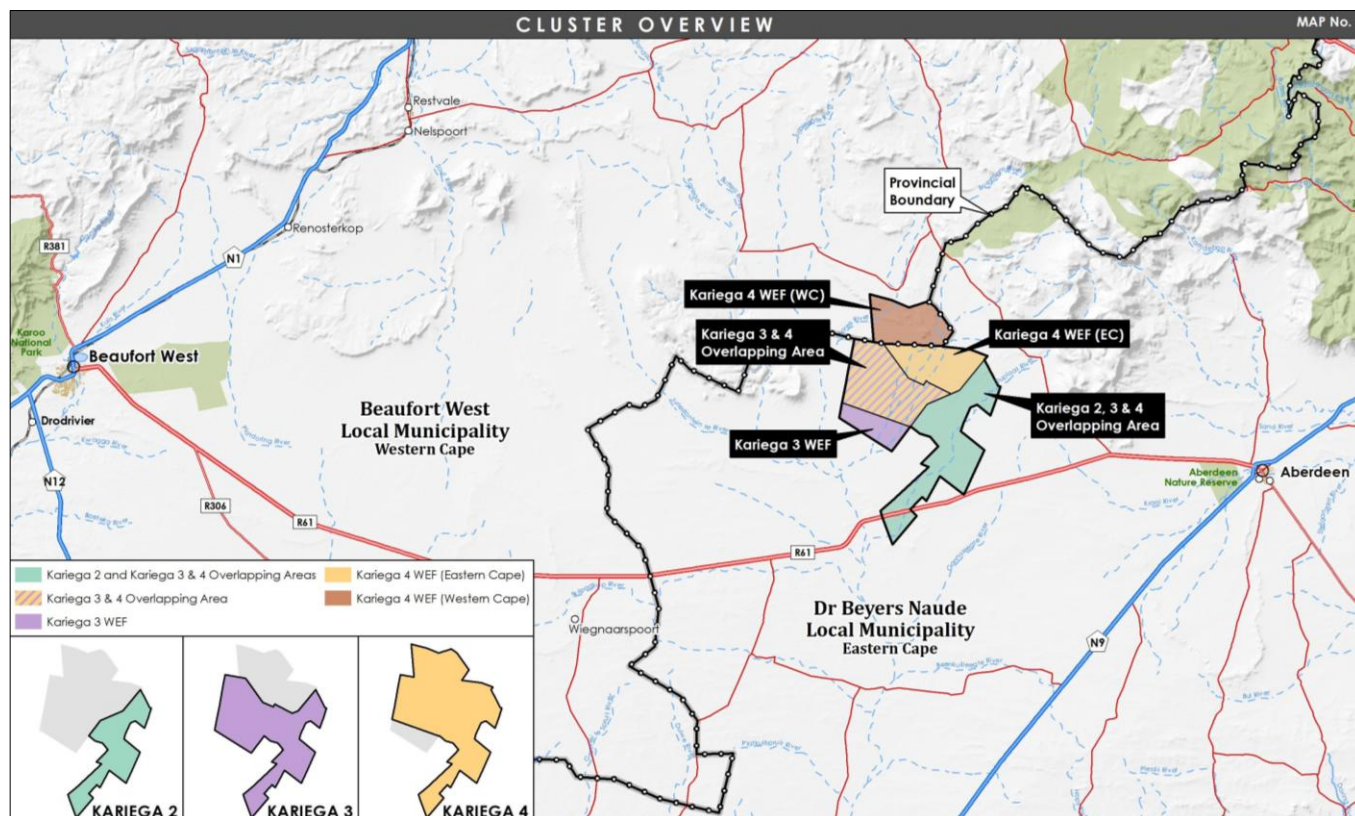
Refer to Map 2 : Property Descriptions & Cadastral Information

The Kariega 4 WEF is part of a cluster of 3 Wind Energy Facilities that is proposed in the Eastern Cape and Western Cape, between Aberdeen and Beaufort West.

The developments are :

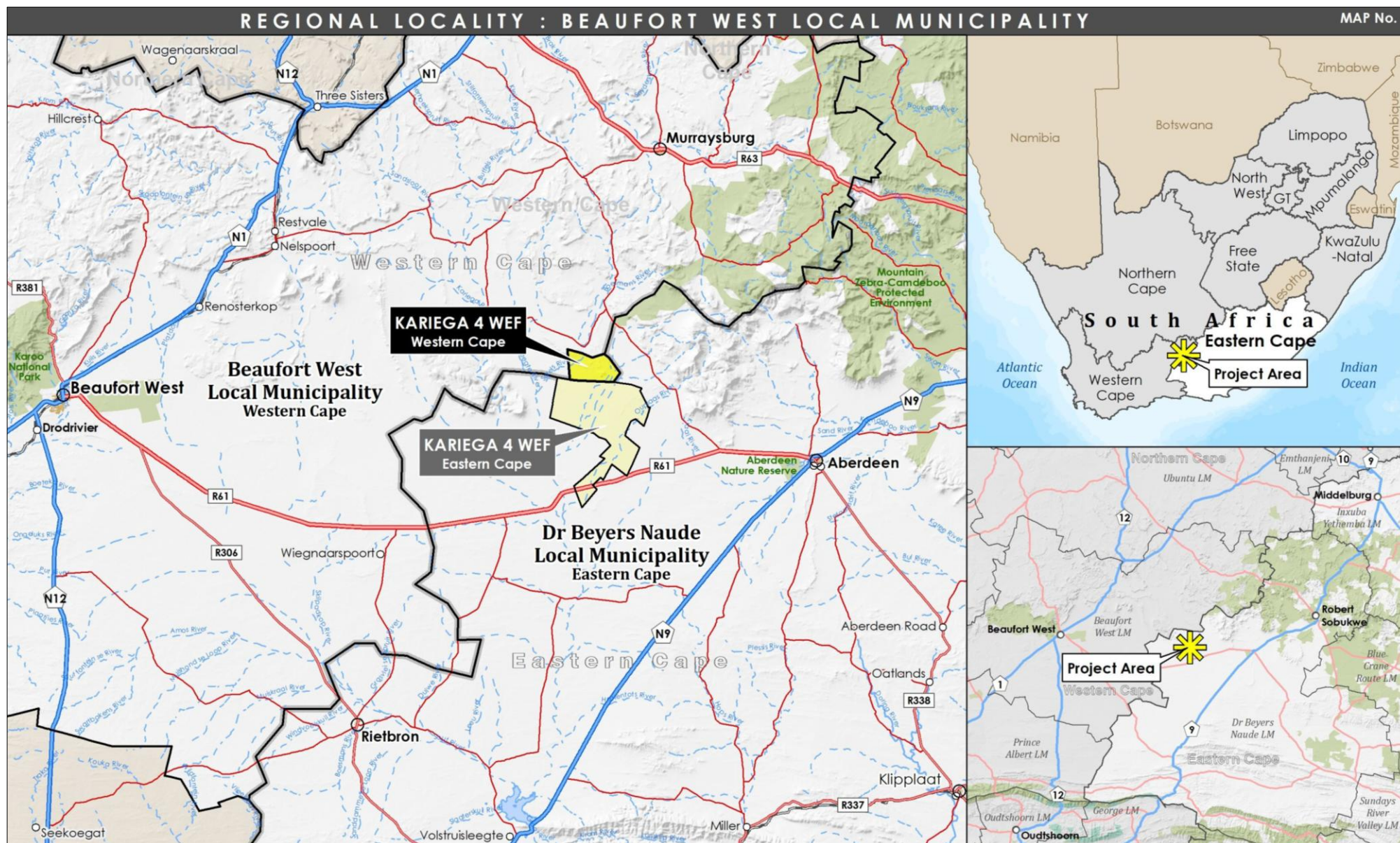
- Kariega 2 Wind Energy Facility
- Kariega 3 Wind Energy Facility and
- Kariega 4 Wind Energy Facility.

Separate applications will be submitted for these developments to ensure SPLUMA compliance. Kariega 4 is a cross-border development, and this will require SPLUMA approval by both the Dr Beyers Naude Municipality and LUPA approval by the Beaufort West Municipality.

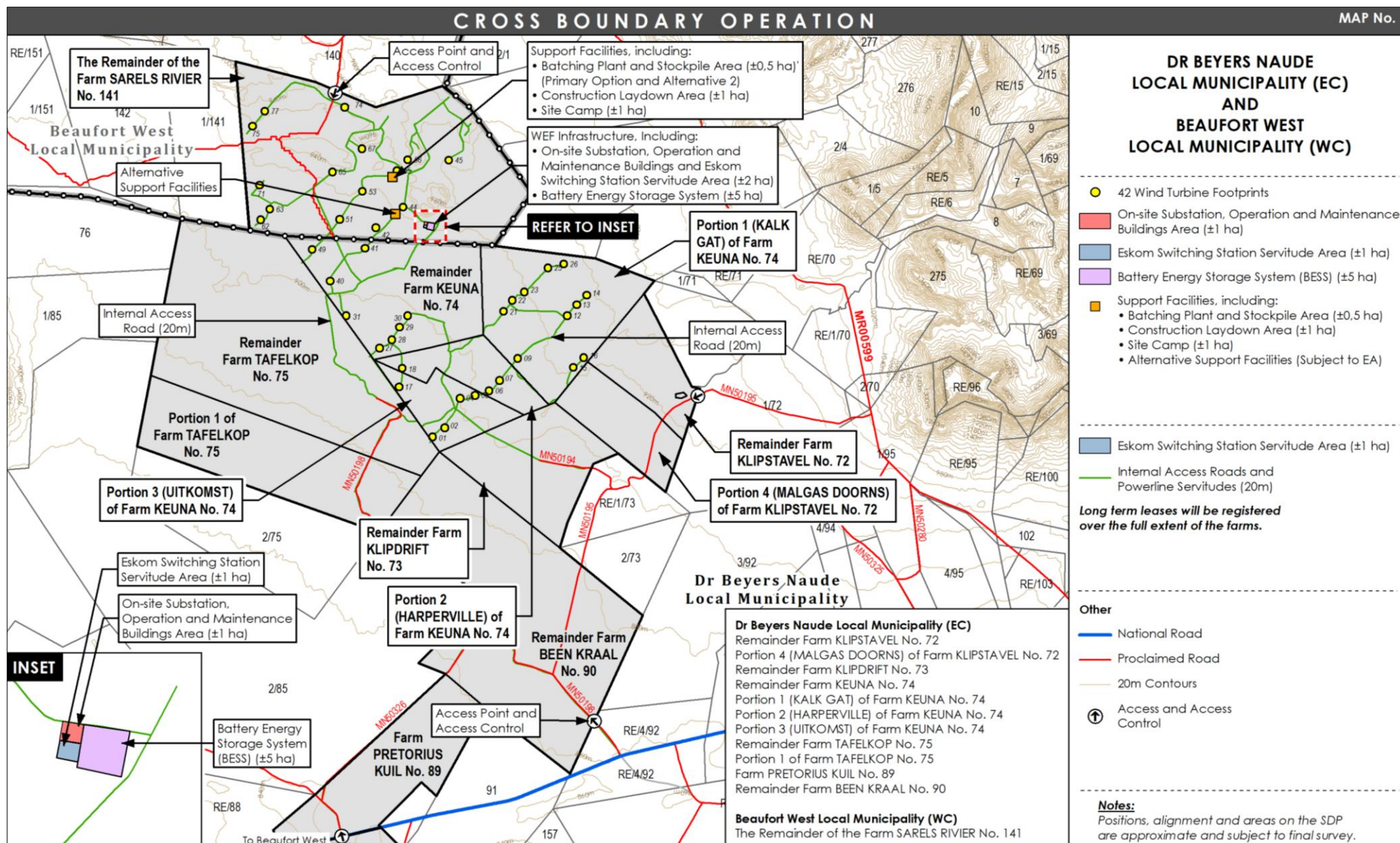


2.1 Cross Boundary Operations

The Kariega 4 WEF, although situated in 2 municipal areas, will be managed as a single wind farm. Separate applications and approvals are requested from the Beaufort West and Dr Beyers Naude Municipalities. The land use management legislation application process and content are basically the same for both Municipalities.



Map 1 : Regional Locality of the Kariega 4 WEF



Map 5 : Cross Boundary Operation

3. Affected Properties

Refer to Map 2 : Property Descriptions & Cadastral Information

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

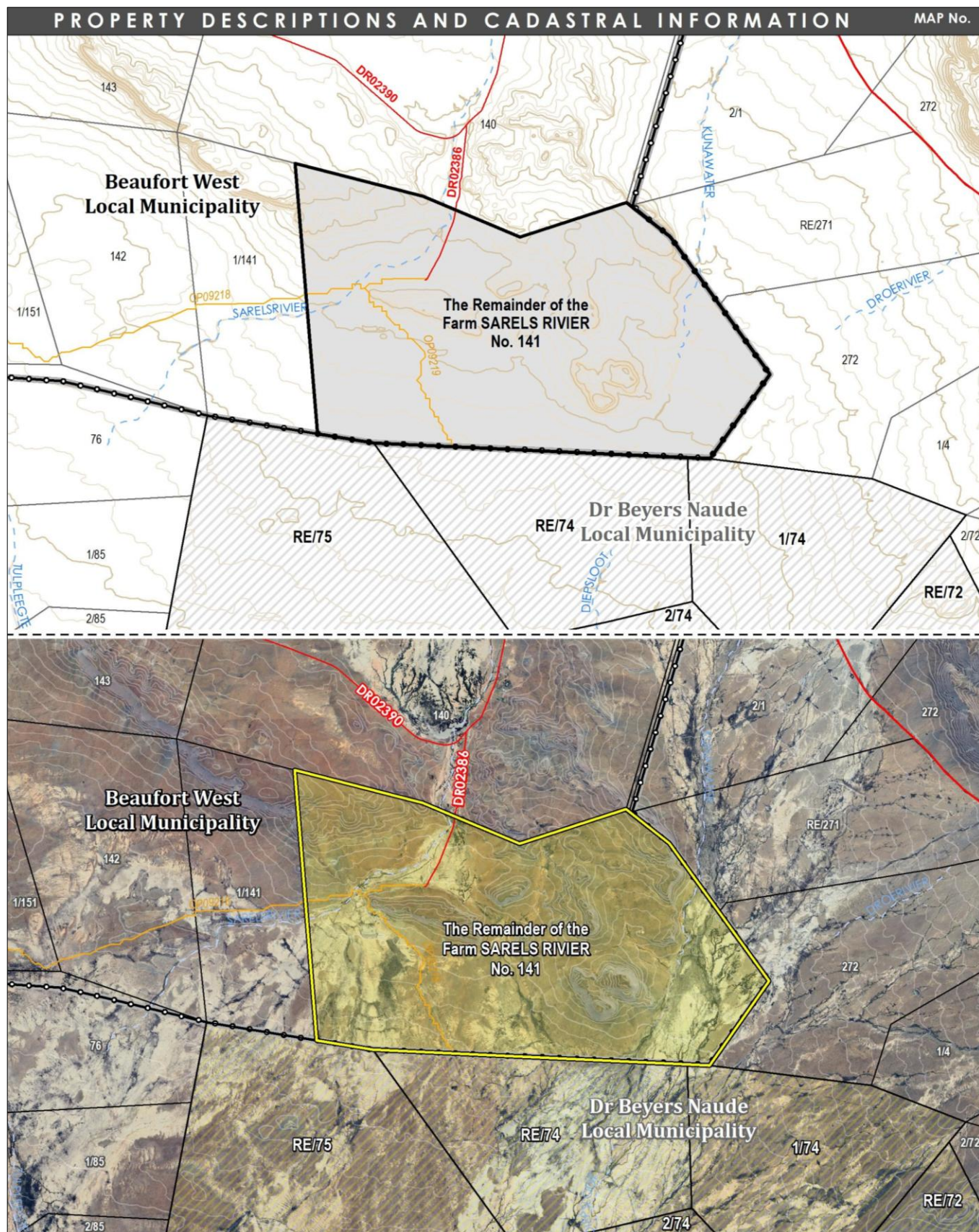
Property Description	Owner	Title Deed No.	Area (ha)	Restrictive Conditions	Bonds
The Remainder of the Farm Sarels Rivier No. 141	Sarelsrivier Trust	T13773/1998	4120.0562	No	No

Table 1 : Property to Accommodate the Kariega 4 WEF in the Beaufort West LM

Refer to Annexure 5 : Deeds Office Enquiry

Refer to Annexure 6 : Title Deed

Refer to Annexure 7 : Conveyancing Certificate



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 portion.

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 Pre-application Consultation

A Pre-application Consultation session with the Beaufort West Local Municipality confirmed :

- That an application for the following will be the appropriate route to follow :
 - Consent Use : Renewable Energy Structures
 - Servitude Exemption
 - Long Term Lease Areas
- The Beaufort West LM will facilitate the public participation process.
- The DEADP office in George will assist with project evaluation.

Refer to Annexure 2 : Pre-application Minutes & Attendance Register

4.3 Legislation

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

- Spatial Planning & Land Use Management Act (Act 16 of 2013) (SPLUMA)
- Western Cape Land Use Planning Act (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 and Authorised Official (AO) decision making and conditions of implementation.

In order to construct, operate and maintain the Kariega 4 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 Kariega 4 WEF will include the following appurtenant structures : On-site Substation, Operation & Maintenance Buildings and Eskom Switching Stations Servitude Area, Battery Energy Storage Systems (BESS), Construction Laydown Areas, Site Camps, Batching Plant and Stockpile Areas.

This application will therefore be for Consent Use (Renewable Energy Structures) for the turbine and support infrastructure footprints.

The Consent Use will further ensure permanent land use rights in support of the construction process, ongoing maintenance and lifecycle of the facility.

Application is not made for Subdivision of individual wind turbine footprint or support infrastructure areas.

■ **Long Term Leases**

The developer or WEF operator will lease the entire farm portion from the relevant land owner(s).

This application includes confirmation of long term leases for the entire farms and the Beaufort West Municipality is requested to endorse the Long Term Leases as indicated on Map 3 : Site Plan (1927E-K4W-SDP-3 dated 06/2026) and Map 4 : Long Term Lease Area & Servitudes Diagram (1927E-K4W-GC-3 dated 06/2026).

Approval for land use change is required from the Department of Agriculture, but approval in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA) for long term leases on entire farm portions, is not required.

■ **Registration of Servitudes (Access & Substation Area)**

Access / Powerline Servitudes and a Switching Station Servitude Area in favour of Eskom (1 ha) are required for Deeds Office Registration. This will enable access to the Eskom facilities on The Remainder of the Farm Sarels Rivier No. 141.

Access and electrical servitudes are exempt in terms of the Beaufort West Land Use Planning By-law (2019). This application includes a request in terms of Section 24 (1) (f) of the Beaufort West Land Use Planning By-law (2019).

■ **Approval of Final Site Plan**

Map 3 : Site Plan (1927E-K4W-SDP-3 dated 06/2026) and Map 4 : Long Term Lease Area & Servitudes Diagram (1927E-K4W-GC-3 dated 06/2026), indicating the turbines, support infrastructure, lease areas and servitudes are 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 off-take 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 (1927E-K4W-SDP-3 dated 06/2026)

Refer to Map 4 : Long Term Lease Area & Servitudes Diagram (1927E-K4W-GC-3 dated 06/2026)

4.4 Application

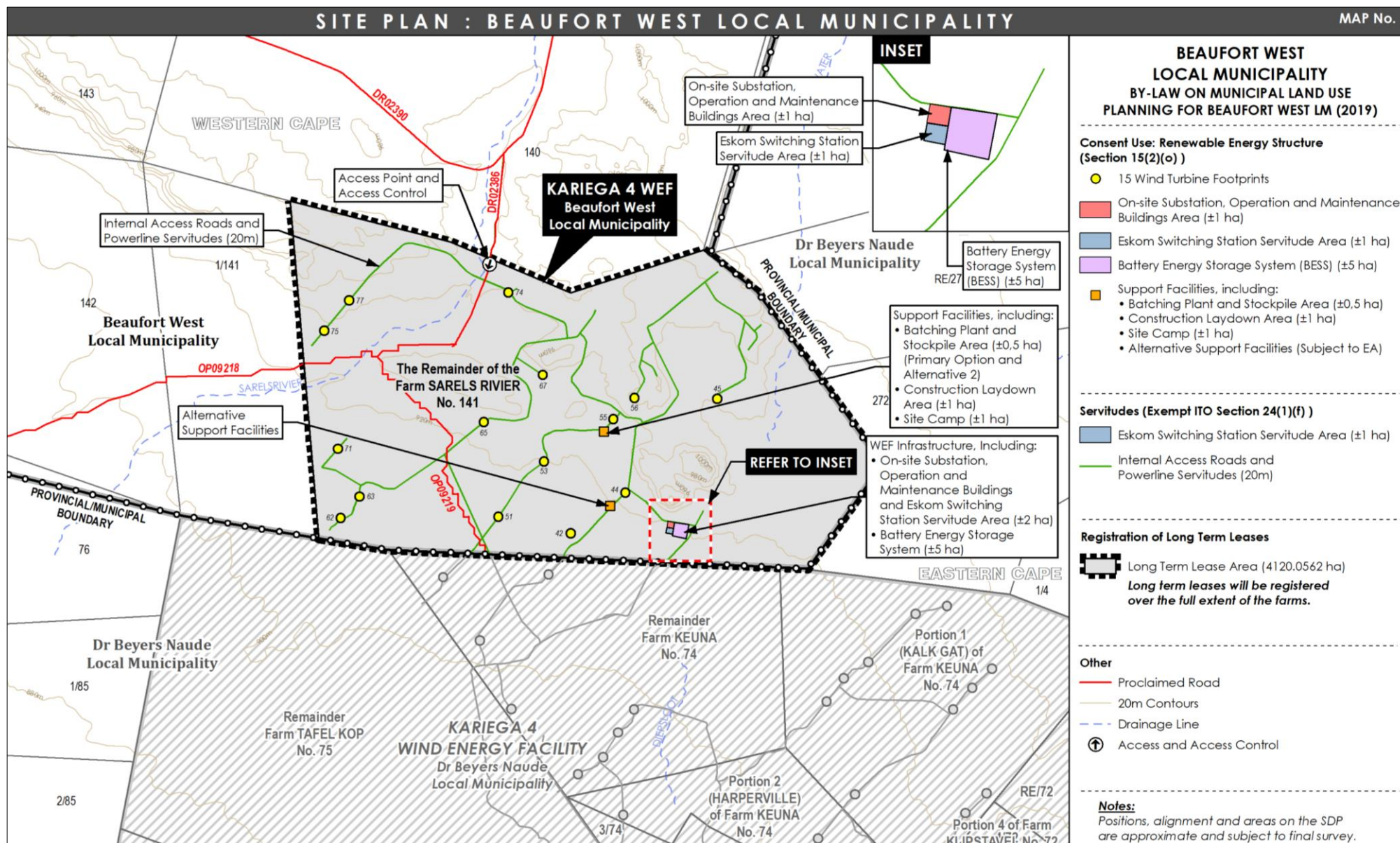
Application is submitted for the following :

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-law (2019), for up to 15 Turbine Footprints, On-site Substation, Operation & Maintenance Buildings and Eskom Switching Stations Servitude Area, Battery Energy Storage Systems (BESS), Construction Laydown Areas, Site Camps, Batching Plant and Stockpile Areas, on the following property, as indicated on the Map 3 : Site Plan (1927E-K4W-SDP-3 dated 06/2026) and the Development Parameters, as indicated in Table 2 below :
 - The Remainder of the Farm Sarels Rivier No. 141
2. **Long Term Lease Areas** over the full extent of The Remainder of the Farm Sarels Rivier No. 141, as indicated on Map 3 : Site Plan (1927E-K4W-SDP-3 dated 06/2026) and Map 4 : Long Term Lease Area & Servitudes Diagram (1927E-K4W-GC-3 dated 06/2026).
3. **Exemption of Servitudes**, in terms of Section 24 (1) (f) of the Beaufort West Land Use Planning By-law (2019), for servitudes for Powerline / Access and Eskom Switching Station Area, as indicated on Map 3 : Site Plan (1927E-K4W-SDP-3 dated 06/2026) and Map 4 : Long Term Lease Area & Servitudes Diagram (1927E-K4W-GC-3 dated 06/2026).
4. **Endorsement of Map 3 : Site Plan** (1927E-K4W-SDP-3 dated 06/2026) and **Map 4 : Long Term Lease Area & Servitudes Diagram** (1927E-K4W-GC-3 dated 06/2026).

Development Parameters

Zoning	Agricultural Zone 1
Special Consent	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 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.
Total Farm Area	• ± 4 120 ha : Beaufort West LM • ± 20 327 ha : Dr Beyers Naude LM
Turbines	Total Turbines : Up to 42 • Up to 15 : Beaufort West LM • Up to 27 : Dr Beyers Naude LM
Export Capacity	Total Export Capacity : Up to 420 MW • Up to 270 MW : Dr Beyers Naude LM • Up to 150 MW : Beaufort West LM
Wind Turbine Specifications	• Rotor diameter : up to 200 m • Hub height : up to 150 m • Blade length : up to 100 m • Blade tip height : up to 250 m
Supporting Infrastructure	• 15 Turbine Footprints • Temporary Laydown / Assembly Areas at Turbines • On-site Substation and Operations and Maintenance Buildings (± 1 ha) • Eskom Switching Station Servitude Area (± 1 ha) • Battery Energy Storage System (BESS) (± 5 ha) • Construction Laydown Area (± 1 ha) • Site Camp (± 1 ha) • Batching Plant and Stockpile Areas (± 0.5 ha) • Alternative Support Facilities (subject to EA)
Site Access	• Various access points as per the Environmental Authorisation • From R61, DR02310, MR00599, MN50195 and MN50198, directly and indirectly
Setback Lines	• 1.5 times blade height along outer boundary • As per the Beaufort West Land Use Scheme for other structures

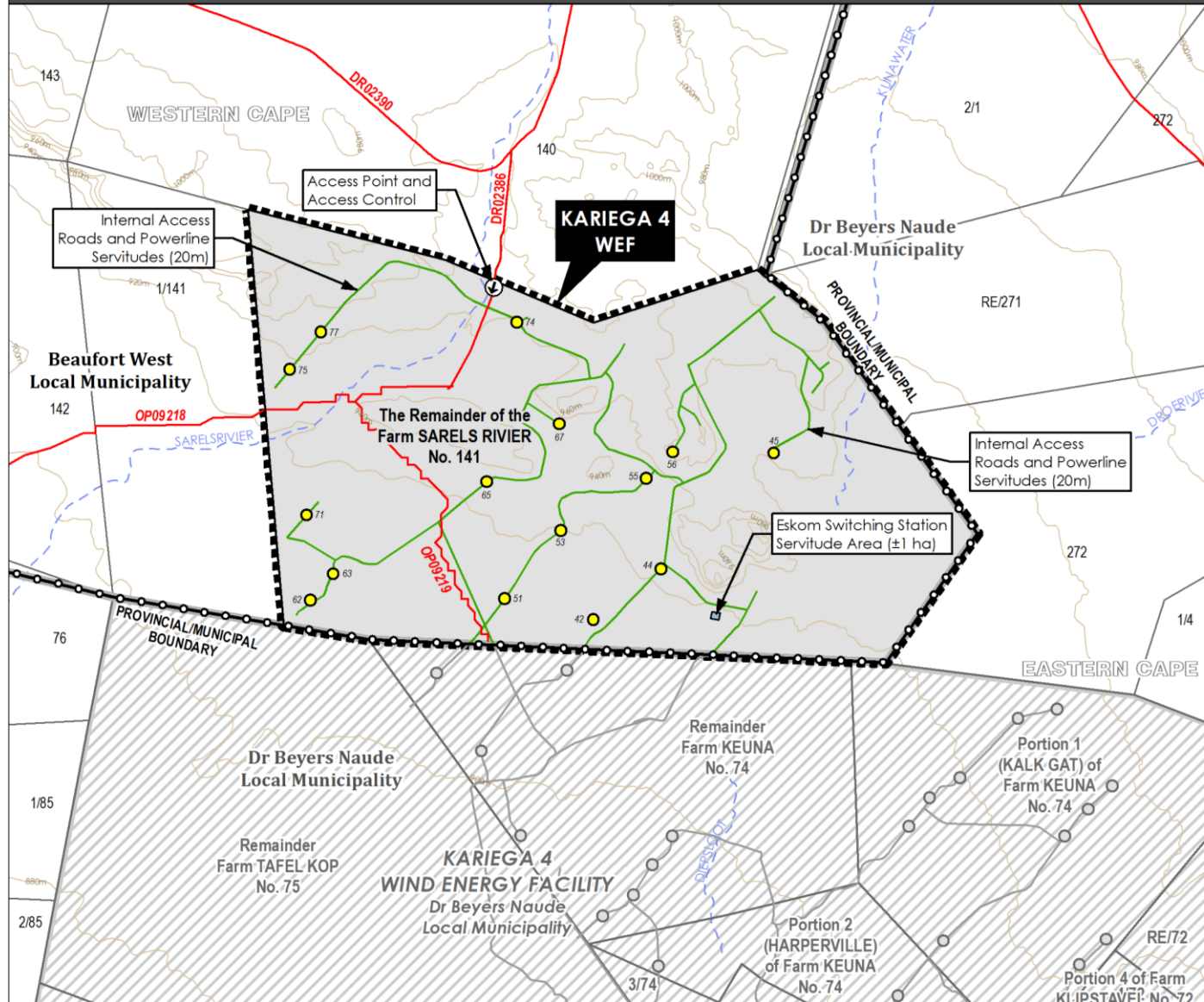
Table 2 : Development Parameters



Map 3 : Site Plan

LONG TERM LEASE AND SERVITUDES DIAGRAM : BEAUFORT WEST LOCAL MUNICIPALITY

MAP No.



AFFECTED LAND PORTIONS (LONG TERM LEASE AREAS AND SERVITUDES)		
Property Description	Servitude Type	Width/Area
The Remainder of the Farm SARELS RIVIER No. 141	Access Roads and Powerlines Servitudes	20m Wide
	Eskom Switching Station Servitude Area	±1 ha
	Long Term Lease Area	±4120.0562 ha

LEGEND

- Internal Access Roads and Powerline Servitudes (20m)
 - Eskom Switching Station Servitude Area (±1 ha)
 - Long Term Lease Areas (±4120.0562 ha)
- Long term leases will be registered over the full extent of the farm.**

NOTE: Positions, areas and alignment are approximate and subject to final survey.

Map 4 : Long Term Lease Area & Servitudes Diagram

5. Existing Zoning, Land Use & Site Description

5.1 Zoning

In terms of the Zoning Scheme and the Beaufort West Municipality Zoning Register, the property is 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 Basic Assessment Report (September 2024) and Specialist study reports, describes the study area.

▣ Land Use

The properties are currently zoned for agricultural land use (Agricultural I) and the actual land use is by-and large extensive farming with goats, sheep and some game. The project site is located in a sheep farming agricultural region. Grazing is the dominant agricultural land use on the site and surrounding properties. Grazing capacity of the site is low at 24 hectares per large stock unit.

▣ Topography

The general topography of the site is defined as undulating Nama-Karoo, but with the Camdeboo Mountains to the north-east creating a significant landform that does influence the overall scenic quality and positively influences the landscape character. These landforms have been flagged in the CTS Heritage report as being significant landscape elements. The other dominating topographic element is the large, predominantly flat plain to the south that typifies the Nama-Karoo landscape.

The North to South Profile depicts a south facing aspect with high ground to the North rising to 1300mamsl, dropping rapidly at the 10km mark to a lower plain elevation of 1000mamsl that continues to fall in gradient to 800mamsl at the 76km mark. The proposed wind farm (combined) starts at the 23km mark and continues to the south up to the 53km mark. The predominant gradient of the proposed development area is defined as flat, with a drop in elevation of 150m over the 30km distance.



Angora goats (mohair production, top left), Springbuck (game propagation and hunting, top right), Merino sheep (wool and meat, bottom left) and work horses (bottom right) are some of the animals found on the farm properties and those adjacent (Source : FBAR dated 11.09.2024)



Typical farm infrastructure found on the proposed development properties include sheering camps with loadings ramps (top left), farm steads with stalls (top right), enclosures for small stock animals (bottom left), mobiles herders outpost (bottom right) (Source : FBAR dated 11.09.2024)



The area is earmarked by significant sheet (top left) and donga erosion (top right) most likely due to relative recent droughts and historical poor veld and stormwater management practices. Farmers have attempted to vegetate these eroded areas by digging rehabilitation hollows to allow seed capture and water retention as well as innumerable low earth ridges to slow down water flow (Source : FBAR dated 11.09.2024)



The infrastructure on some of the farm properties were dilapidated (Source : FBAR dated 11.09.2024)



Farm gates with electronic solar powered motor (left) typical jackal proof fence with diamond mesh at bottom and single strand wire at the top, the rocks packed at the base help prevent burrow animals from diggings holes underneath the fence creating access to predators (Source : FBAR dated 11.09.2024)

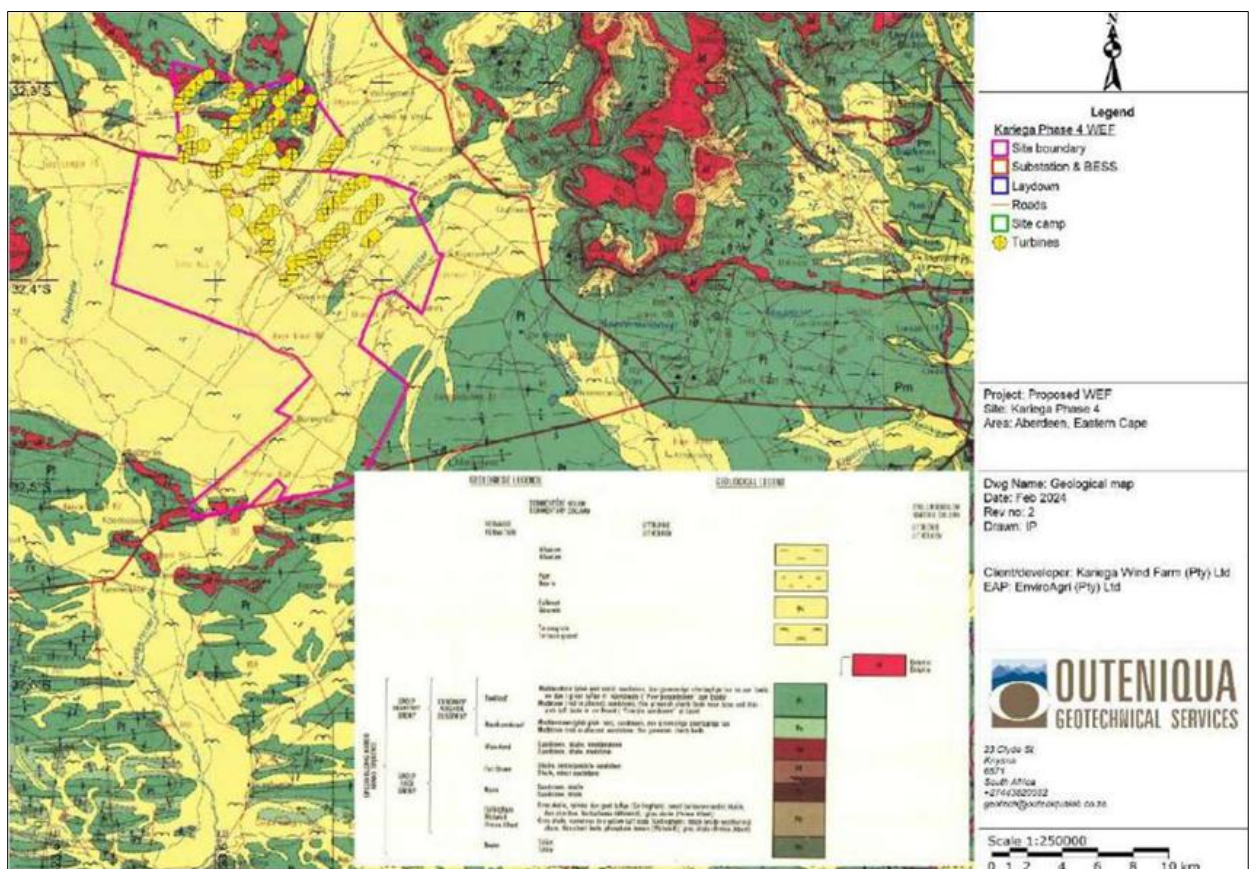


Cultivated fields are very limited in the area with these (the light green patches between the trees) located on farms adjacent the development properties
(Source : FBAR dated 11.09.2024)

■ Geology

The geological map of the area indicates that the bedrock geology of the site consists of sandstone and mudstone of the Permian Teekloof Formation (green on map) of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). The mapping indicated very gentle folding of these sedimentary strata on an east-west trending fold axis, with dip angles generally less than 20°.

Prominent Jurassic dolerite intrusions were also mapped within the site area and surrounds (red on map). An old borrow pit was identified on the southern portion of the site (32.512°S, 23.633°E) where local sources of dolerite had been mined in the past, presumably for the construction of the R61 road. Significant deposits of quaternary alluvium were mapped over large parts of the site (yellow on map) which were associated with the Kariega River and its braided network of tributaries.



Geological map of the area
(Source : FBAR dated 11.09.2024)



Blocky, hard sandstone of the Teekloof Formation exposed in road cutting on R61
 (Source : FBAR dated 11.09.2024)



Dolerite exposure on an old borrow pit
 (Source : FBAR dated 11.09.2024)

No major geological faults were indicated on the map and according to the Seismic Hazard map of SA, 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 (rather strong, felt by all, minimal 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.

Climate

The study area and surrounding plain is classified as arid (rainfall 100-200 mm/a). Rainfall increases progressively northward from the site as elevation increases which can be seen through the change in vegetation. The plains veld consists of karroid scrub, with trees essentially limited to ephemeral watercourses and farmyards. The study area is prone to extended periods of drought and at the time of this report still recovering from a severe decade long drought.

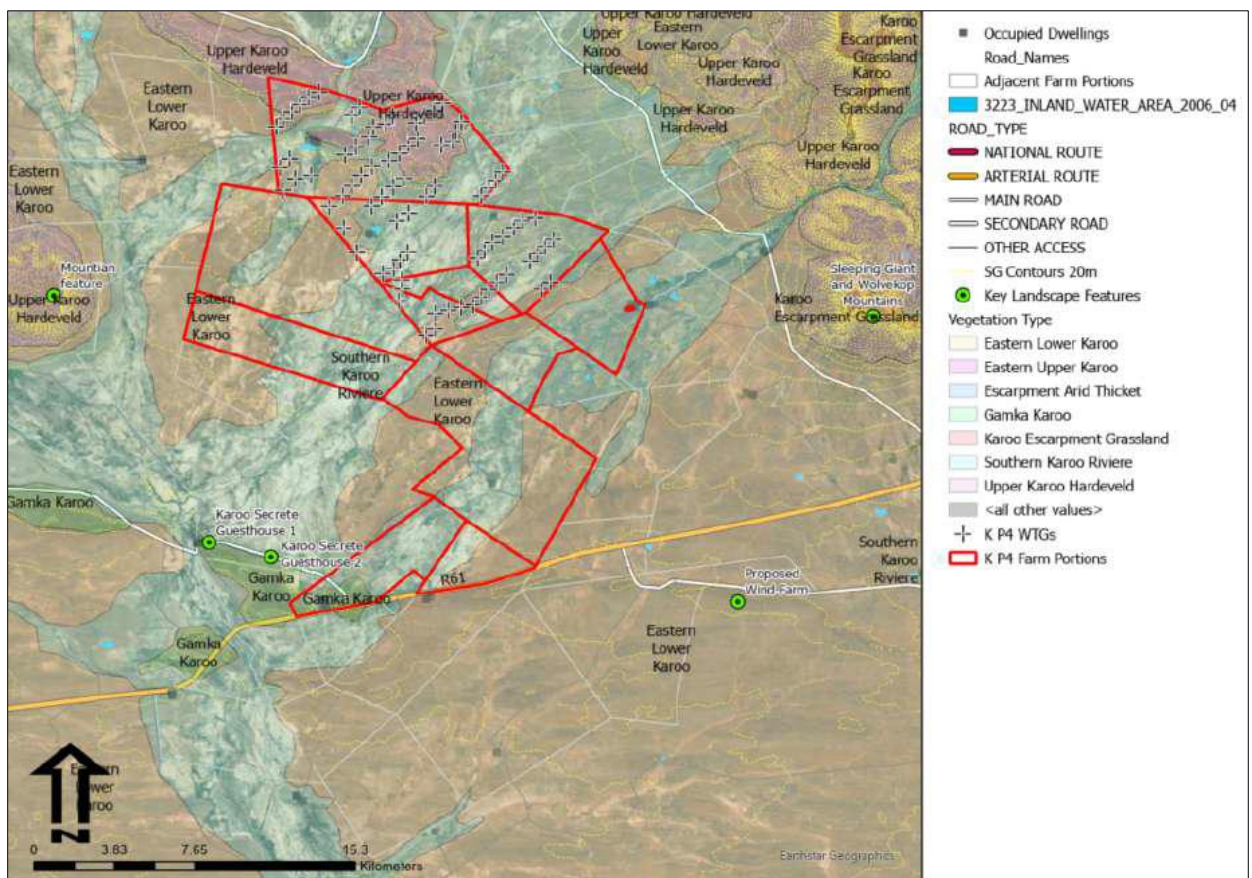
The mean maximum temperature in summer is a hot at $\approx 30^{\circ}\text{C}$, the mean minimum temperature in summer is $\approx 18^{\circ}\text{C}$. The mean maximum temperature in winter is $\approx 17^{\circ}\text{C}$, the mean minimum temperature in winter is a near freezing $\approx 3^{\circ}\text{C}$.

Precipitation is highest in the spring and autumn, and generally throughout the summer (normally thunder showers) and to a lesser extent winter (frontal) rainfall. Rainfall peaks in February with the least amount of precipitation between the winter months of July and August.

Wind in the area is greatest in winter and early spring often reaching average speeds of 19 to 38 km/h. August and September have several days where exceptionally high wind speeds occur of higher than 38 km/h. The dominant wind direction is from the north and northwest as well as southeast.

Vegetation

Vegetation type is a large factor in determining the scenic quality or the site in terms of colour and texture, as well as influencing the local ability of the landscape to absorb the landscape change. The map below outlines the vegetation type based on BGIS mapping (South African National Biodiversity Institute, 2018).



BGIS Biome and Vegetation Type Map (South African National Biodiversity Institute, 2018)

(Source : FBAR dated 11.09.2024)

According to the South African National Biodiversity Institute (SANBI) 2012 Vegetation Map of South Africa, Lesotho and Swaziland (South African National Biodiversity Institute, 2012) the project area is located in the Nama-Karoo and Azonal Vegetations Biome with the main vegetation types being Eastern Lower Karoo, Southern Karoo Riviere and a small area to the north of Upper Karoo Hardeveld. Much of the area is covered by the lower lying riviere areas with small thorn trees growing along the drainage lines, with the low scrub vegetation of the Eastern Lower Karoo being more representative of the flat Nama- Karoo type landscape.

Of relevance to the project is that the vegetation is low in height and sparse in the arid environment. The vegetation will offer very limited screening for the proposed turbines, and due to the arid environment, is unlikely to be suitable for vegetation screening without a long-term management plan.

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
- Access Roads & Site Roads
- Substations / Switching Stations
- Operation & Maintenance Area and Offices
- Battery Energy Storage System (BESS)
- Powerlines
- Construction Laydown Area & Site Camps
- Batching Plant and Stockpile Area
- Concrete Tower Factory

The various Wind Energy Facility components are briefly described below.

▣ Wind Turbines

The wind turbines are the main functional components of the proposed WEF and in essence consist of a rotary device that extracts energy from the wind and this mechanical energy generated is converted to electricity to be transported to the end user. For the Kariega WEF these wind turbines will be large commercial scale turbines consisting of a rotor which consists of three blades and a hub, a nacelle which houses the generator, a tower and foundation. When the wind blows at optimal speeds the blades turn at tip speeds of 200-300 km/hour or more depending on turbine specifications, effectively turning the geared generator to produce mechanical energy which is transformed into electricity transport by underground MV cables to the On-site Substation from where it's either connected to the Eskom Switching Station or BESS.

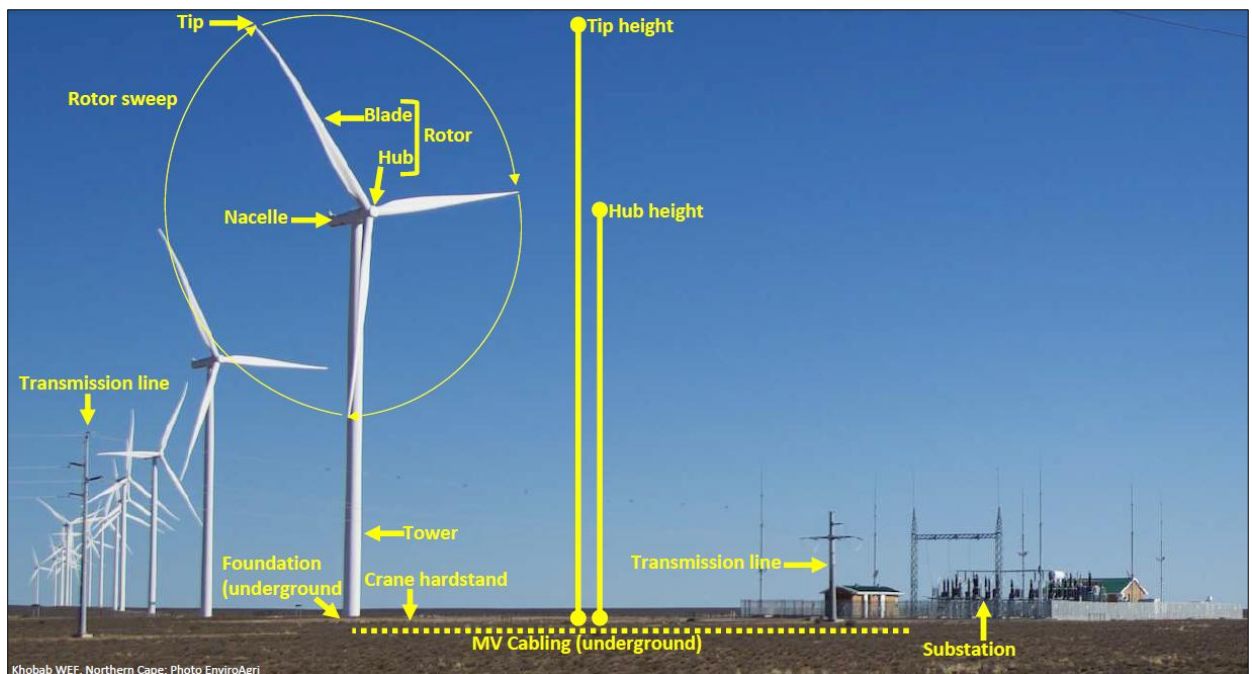
At Kariega 4 up to 42 turbines of 10MW each with generation capacity of up to 420MW is proposed. The hub height may be up to 150m (i.e. the height of the tower) and the rotor diameter (RD) may be up to 200m (consists of rotor and three blades). The rotor has three blades that typically rotate up to 25 revolutions per minute (rpm) depending on the turbine specifications, wind speed and pitch. The blades are usually coloured white or light grey and in the case of this project are proposed with one blade painted with two signal red bands to reduce potential birds strikes. The nacelle typically contains the generator, control equipment, gearbox and anemometer in order to monitor the wind speed and direction which is used to turns the turbine to face into the wind and thus increase power generation. The tower is constructed from steel or concrete and supports the rotor and nacelle. An increase in tower height typically coincides with wind of greater velocity, therefore increasing the height of a turbine increases the expected wind speeds and generation output.

At the base of the turbine tower a transformer steps up the voltage for electricity evacuation to the Substation/BESS. The turbines are built on concrete foundations which are ~3 m deep and up to 30 m in diameter. The exact dimensions of foundations are underpinned by founding conditions which will only be established during detailed design. The foundations are one of the main contributors to construction traffic since they typically consist of $\pm 600\text{m}^3$ of concrete and at 6m^3 concrete per truck means a 100 loads per turbine.

Infrastructure ancillary to the turbines include permanent crane hardstands used to assemble the turbine components as well as undertake maintenance (hence it being permanent). Temporary Laydown and Assembly Areas (i.e. construction phase) are used adjacent each turbine to place turbine components, park vehicles, and in general provide a formal space to undertake construction activities. The exact position and orientation of the hardstands and laydowns will be determined during the detailed design of infrastructure within allocated buffer areas.

The reason why these specification are provide in terms of an "up to" context is because the developer may decide to use components with lesser dimensions but due to the constant advancement in technology the greater threshold of turbine specifications are assessed as a "worst case scenario" although in some instance the larger dimension may actually be a positive mitigation factor (e.g. a higher bottom tip height may have reduced impact on low flying birds and greater generation capacity is a positive socio-economic factor). Thus, these dimensions represent a maximum specification for assessment purposes and depends on technology available at the time of construction.

Turbines are remotely controlled and in the case of excessive wind speeds or required curtailment because of sensitive bird or bat species the blades may be turned away (sideways) from the wind to stop rotation which is aided by a braking mechanism. When the wind speed is optimal, or the risk of species impact is mitigated the rotor is turned into the wind again and production resumes.



Wind Turbine Components (Example Only)

■ Access Roads & Site Access

Four potential access points are proposed for the Kariega 4 WEF:

- Directly from R61
- via R61 over Farm RE/4/92
- via R61, Aberdeen/Murraysburg road and over Farm 1/72, Farm 1/95, Farm 5/72 and
- via R61, Aberdeen/Murraysburg road and over Farm RE/140 and Farm RE/139.

It's likely that all the access points may be utilised, given the extent of the site but the main access point will be used most of the time with the alternatives used when it's required to optimise construction traffic. Access roads and internal site roads will have a width of 15-20m wide which consists of 12m road surface width, 1m for side drains either side, 6m one side of the road surface for MV cable trenches and associated disturbance (topsoil, subsoil and vehicle movement). Of the proposed roads ±66km are existing although mostly substantially narrower than proposed road widths (site roads are about 3-4m on average and are often only jeep tracks or unimproved dirt roads, i.e. without wearing course and little to no drainage or stormwater infrastructure). The total ± 126 km (31km shared with Kariega 2 and 49km shared with Kariega 3) with a total road footprint ~254ha (126km x 20m width). It should be noted that the 20m width is a requirement for crane movement and where possible the width will be reduced.

Post construction the roads will be rehabilitated down to 5-10m width which consist of 8m wide road surface, 1m side drain either side (Total Road Footprint ~126ha). All roads will have a gravel wearing course (imported from offsite borrow pits). Where possible, existing tracks will be followed, and all roads associated with the WEF will remain indefinitely and be available for use by landowner post construction. Turning areas or sidings will be required to allow heavy and abnormal vehicles to turn safely. These will be brought on at strategic points on site and at end of roads as identified during detailed design. All roads will be developed within the assessed buffers and may be realigned in terms of stormwater considerations, to reduce cut and fill or optimise detail design.

■ Substation and O&M Complex

The power generated by each wind turbine will be transformed (by a transformer at each turbine) and then connected through underground MW cables to the On-site Substation which in turn is connected to the Eskom Switching Station (for distribution into the national grid) or BESS for storage to be used later. The OHL routes and connecting to a Main Transmission Substation has not been assessed at this stage and depends on Eskom requirements and capacity prior to construction of the proposed WEF.

The On-site Substation and O&M Building will be up to ~1 ha in extent and transform the 33kV power up to 132kV. This area will include site office, workshop, parking, storeroom (which include part storage and oil) and ablution facilities. Directly adjacent will be the Eskom Switching Station of up to ~1 ha which will connect to the On-site Substation to evacuate electricity into the national grid.

■ Battery Energy Storage System (BESS)

The purpose of a BESS is to save and store excess power as it is generated until such time when the capacity is required. BESS systems therefore aim to overcome one of the key constraints faced by REFs, i.e. providing energy when the demand is greatest and not necessarily when the resource is optimal thus offsetting grid fluctuations. Technological advances within BESS are frequent and at this stage it's envisioned that Lithium-Ion technology will be used, as assessed, although in future more efficient technology might be considered for the BESS. Lithium-Ion technology entails rechargeable electrochemical battery where lithium ions are transferred between the electrodes during the charge and discharge reactions. Currently, Lithium-Ion technology is the dominant energy storage technology for utility-scale applications due to its high level of energy efficiency, relatively high energy density (smaller area required), relative low maintenance and long lifecycle of up to 15-year life (depending on a host of technical factors).

Lithium-Ion technology is not without risk which include temperature fluctuations which may render batteries at risk of being damaged due to instability of temperatures with resultant impacts that could include fire, or permanent structural damage to the batteries. In addition, there is a risk associated with the chemicals contained within the actual battery storage system itself since the Lithium-Ion battery would contain heavy metals (e.g. cobalt or manganese) to effect electron transfer. These risks are typically mitigated by monitoring and cooling system as well as fire detection and suppression systems, but it's highly likely that the BESS will be subject to a MHI risk assessment before construction to ensure it is compliant in terms of local laws and regulations and health and safety requirements governing battery facilities as well as international standards.

The BESS proposed for Kariega 4 includes an area of up to ~5ha (Adjacent O&M Complex), Lithium-Ion Battery technology with an export capacity of up to 250MW and Storage Capacity 1000MWh (Storage duration 4hrs).

The BESS batteries are typically stored inside containers, and the facility will be connected via underground MV cabling to On-site Substation. The BESS will be fenced for security purposes with a firebreak around the BESS facility included in the footprint.



Battery Energy Storage System (Example only)

▣ **Medium Voltage (MV) Cables**

Each turbine will connect to the On-site Substation via underground MV collector cables (up to 33kV) which follow that facility roads. Typically imported bedding material is needed to lay the cables which will be obtained from a registered, legal commercial source. The footprint of the cables is included in the road widths and therefore no additional footprint is assessed for the MV cables. The trenched areas for MV cables adjacent the roads will be revegetated as part of rehabilitation measures on site.

▣ **Construction Laydown Area & Site Camp**

The Site Camp and adjacent Laydown Area will include temporary site offices, stores, workshops, turbine storage areas, fuel storage, worker eating/rest area and ablution facilities etc. These areas will be rehabilitated after construction. The Laydown Area will be ~1ha and Site Camp another ~1ha per phase.

■ **Batching Plant & Stockpile Area**

Concrete batch plant (temporary, construction phase) will be ±0,5ha per phase and include cement silos, stockpile areas, parking and turning areas, quality test area and the batch plant itself. Batching areas will be situated adjacent laydown areas.

■ **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.

6.2 WEF Construction Process

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

- Pre-Construction
- Construction
- Operation
- Decommissioning

■ **Pre-Construction**

- Search and rescue of plant and animal species
- Resourcing materials to the site
- Fencing and demarcating site boundaries and no-go areas
- Laying out the construction site and footprint
- Establish grievance mechanism (GM)
- Ongoing stakeholder consultation

■ **Construction**

- Phased ground clearing of infrastructure footprint
- Establishment of the construction camp, cement tower factory, laydown areas and batching plants
- Construction of roads, turbines, substation, BESS, and ancillary infrastructure
- Connection of underground cabling to substation
- Connection of substation to switching substation
- Ongoing implementation of GM and stakeholder consultation
- Initiation of rehabilitation

▣ **Operational Phase**

- Continue site rehabilitation commenced in the construction phase
- Operation and maintenance of infrastructure
- Post-construction monitoring of birds and bats
- Adaptive management of turbines based on post-construction monitoring

▣ **Decommissioning of the Wind Farm**

- Site closure plan submitted for decommissioning, BA undertaken.
- Generation of electricity ceases
- Infrastructure components are disassembled and recycled or disposed of
- Infrastructure that will no longer be used will be removed
- Site rehabilitation
- Establish grievance mechanism (GM)
- Ongoing stakeholder consultation

6.3 Socio Economic Development

The Social Impact Assessment Report for the Kariega 4 Wind Energy Facility concludes that :

"The findings of the SIA indicate that the proposed Kariega 4 WEF will result in several social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phases. The project will also contribute to local economic development through socio-economic development (SED) contributions. In addition, the development will improve energy security and reduce the carbon footprint associated with energy generation. The significance of SED contributions is rated Major Positive. The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phases are likely to be Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The site is also located within the Beaufort West REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities and associated infrastructure."

7. Renewable Energy in Context

Due to global concerns such as climate change, and the ongoing 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 Kariega 4 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 & Land Use Management Act (Act 16 of 2013) (SPLUMA)
- Western Cape Land Use Planning Act (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 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*

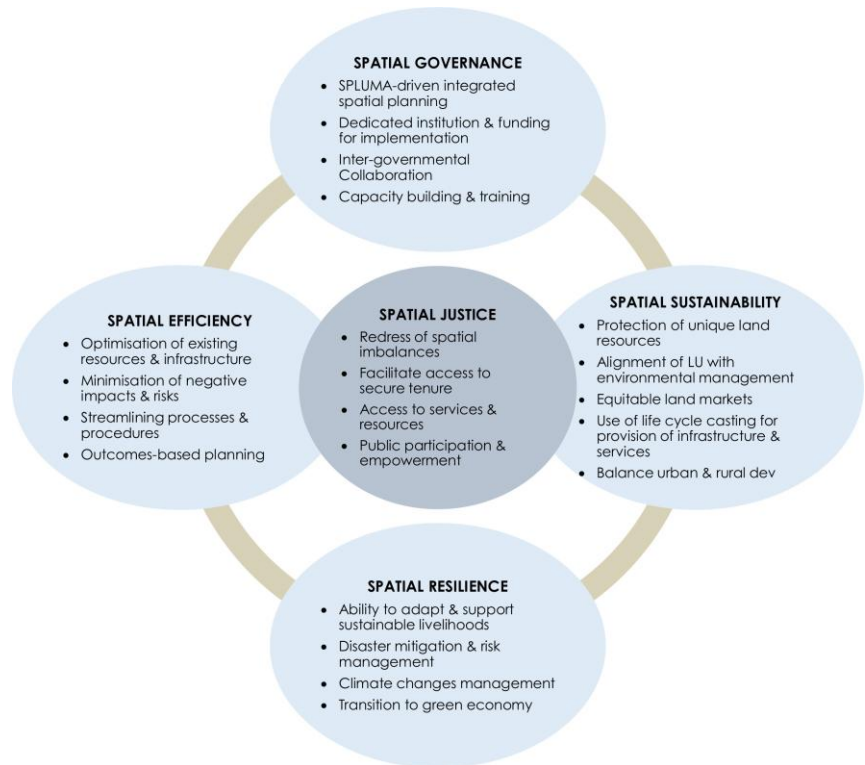
9. Spatial Planning & Land Use Management Act (SPLUMA)

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 Aberdeen.
- 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 has been obtained from the Department of Forestry, Fisheries and the Environment
- 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 much 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 Kariega 4 WEF can contribute up to 420 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 EMPs.
- 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.

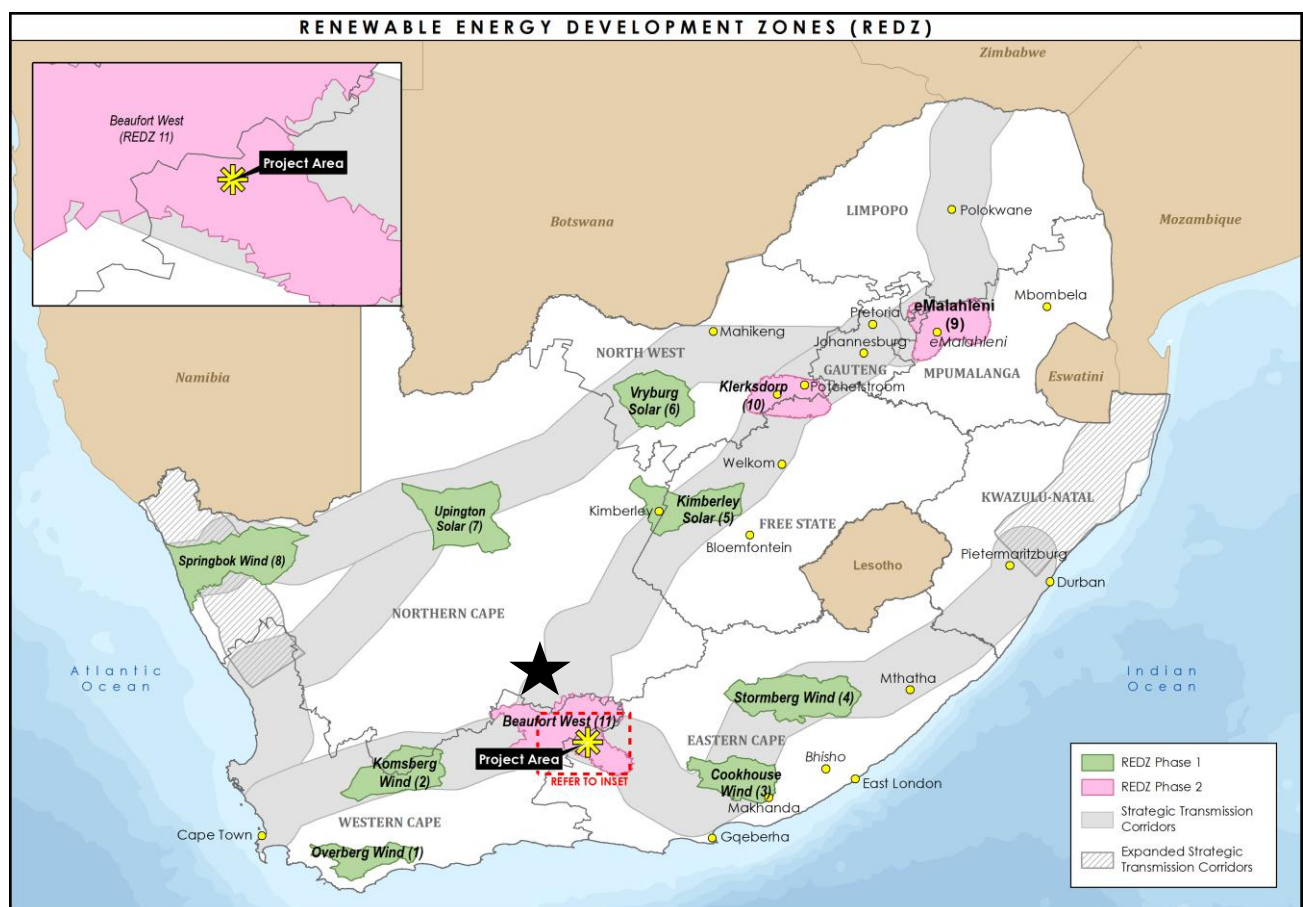
The Wind and Solar Photovoltaic (PV) Energy SEA aims to identify geographical areas best suited for the rollout of large-scale wind and solar PV energy facilities and infrastructure. These areas are referred to as Renewable Energy Development Zones (REDZs) and strategic transmission corridors. The SEA 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 Kariega 4 Wind Energy Facility in relation to the identified REDZs and Power Line Corridors. The Kariega 4 Wind Energy Facility falls within the Beaufort West REDZ 11 and the Eastern Strategic Transmission Corridor.

The Kariega 4 Wind Energy Facility was 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.



DFFE Strategic Transmission Corridors & REDZ

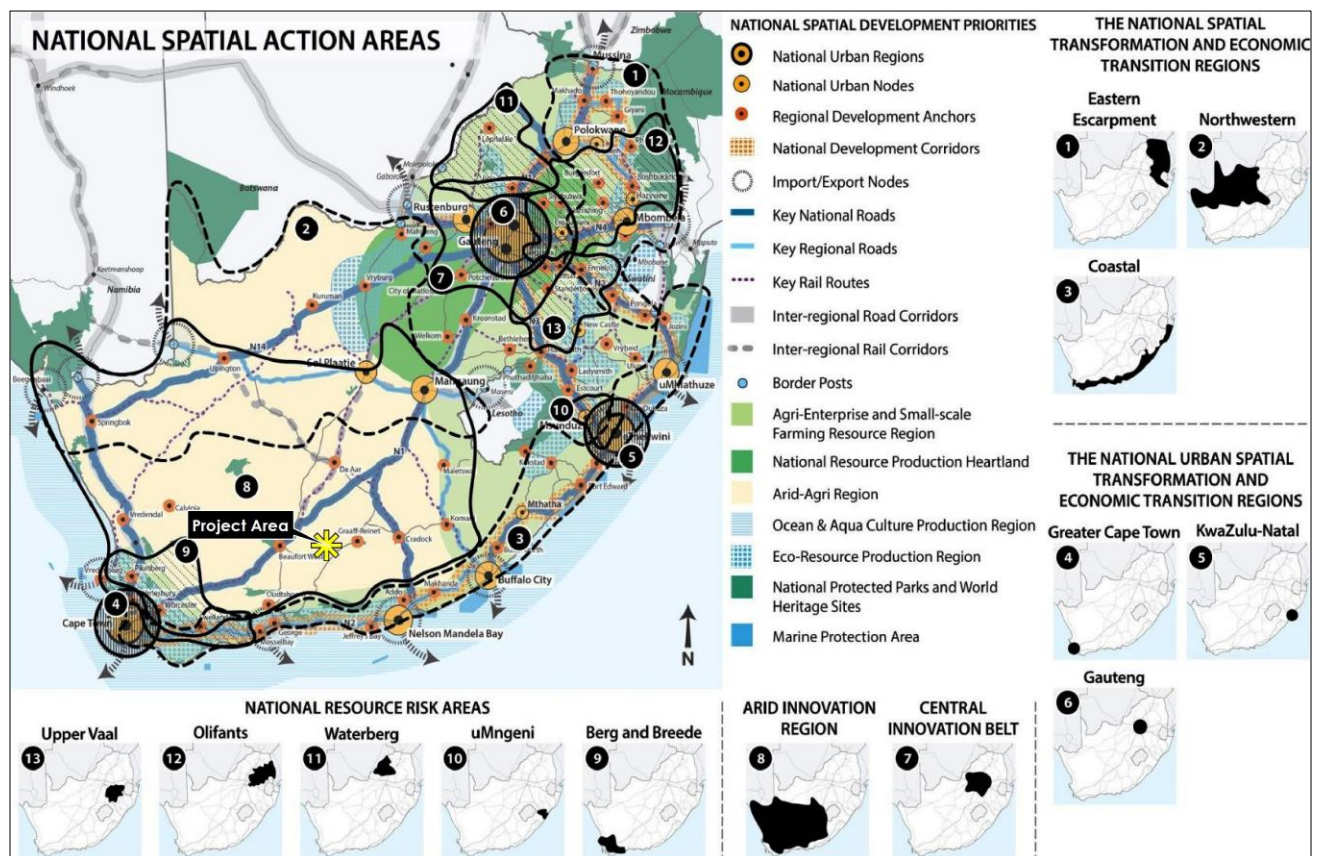
10.9 National Spatial Development Framework (2022)

The National Spatial Development Framework (NSDF) 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; and
- Introduce Sub-national Spatial Development Planning in the form of “functional development regions”.

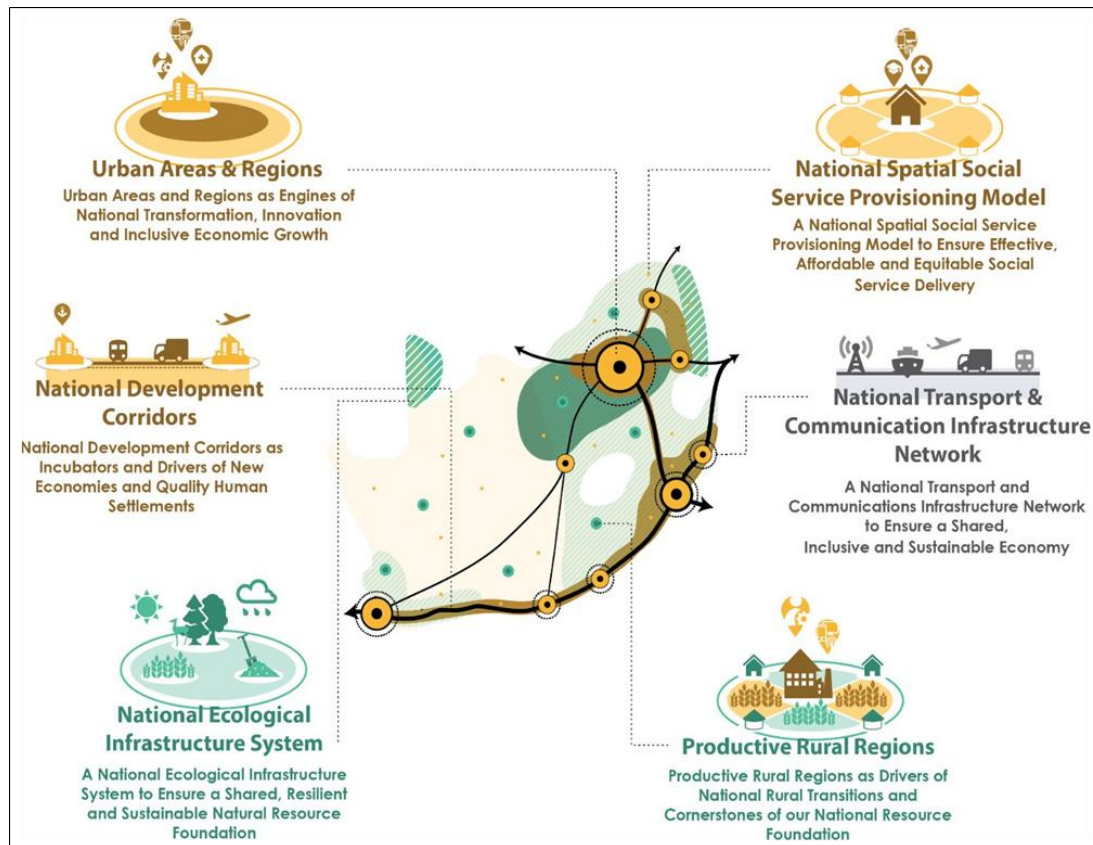
The NDP supports a move away from coal-based energy generation in line with international trends and climate protocols. Long-term spatial and infrastructure planning must therefore take this into account.



National SDF (2022)

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.



National SDF Spatial Development Levers (2022)

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.

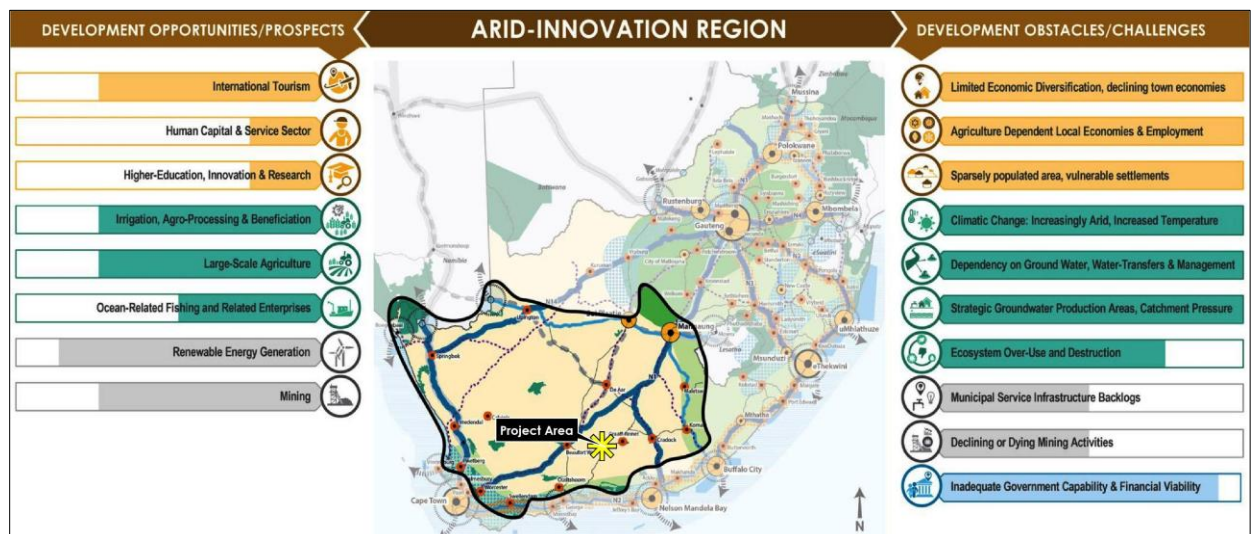
In terms of the NSDF, five Implementation Action Areas are identified. The proposed Kariega 4 Wind Energy Facility is situated within the Arid Innovation Region.

■ 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	Strengthening regional development anchors as connecting, catalytic and interface points.	Supporting intensive, high-value agriculture by innovative means. Strengthening and expanding alternative energy generation.	Supporting connections between national urban nodes and regional development anchors.	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.

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.



National SDF Arid Innovation Region (2022)



National SDF Arid Innovation Region (2022)

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.

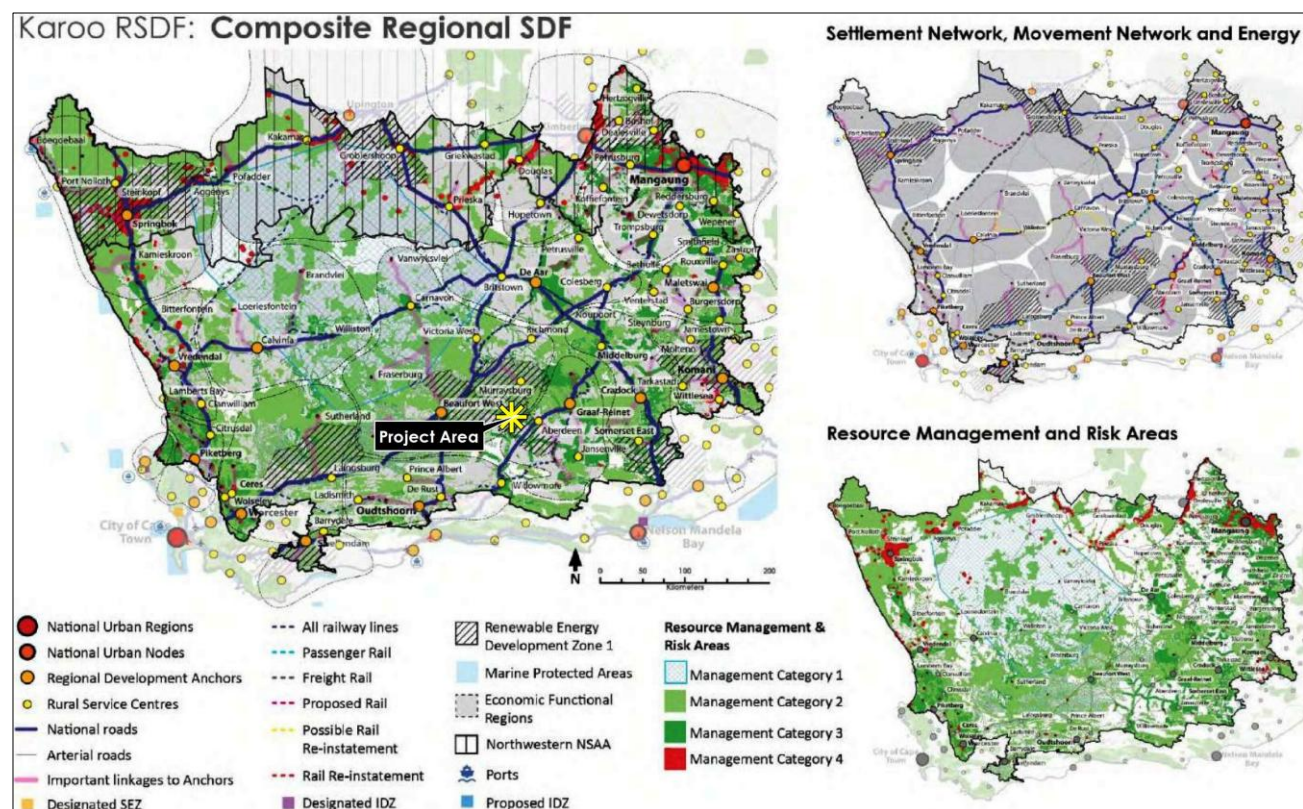
and spatial objectives :

- 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.



Karoo Regional SDF (2023)

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

It is therefore clear that the Kariega 4 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 (SDF) (2014)

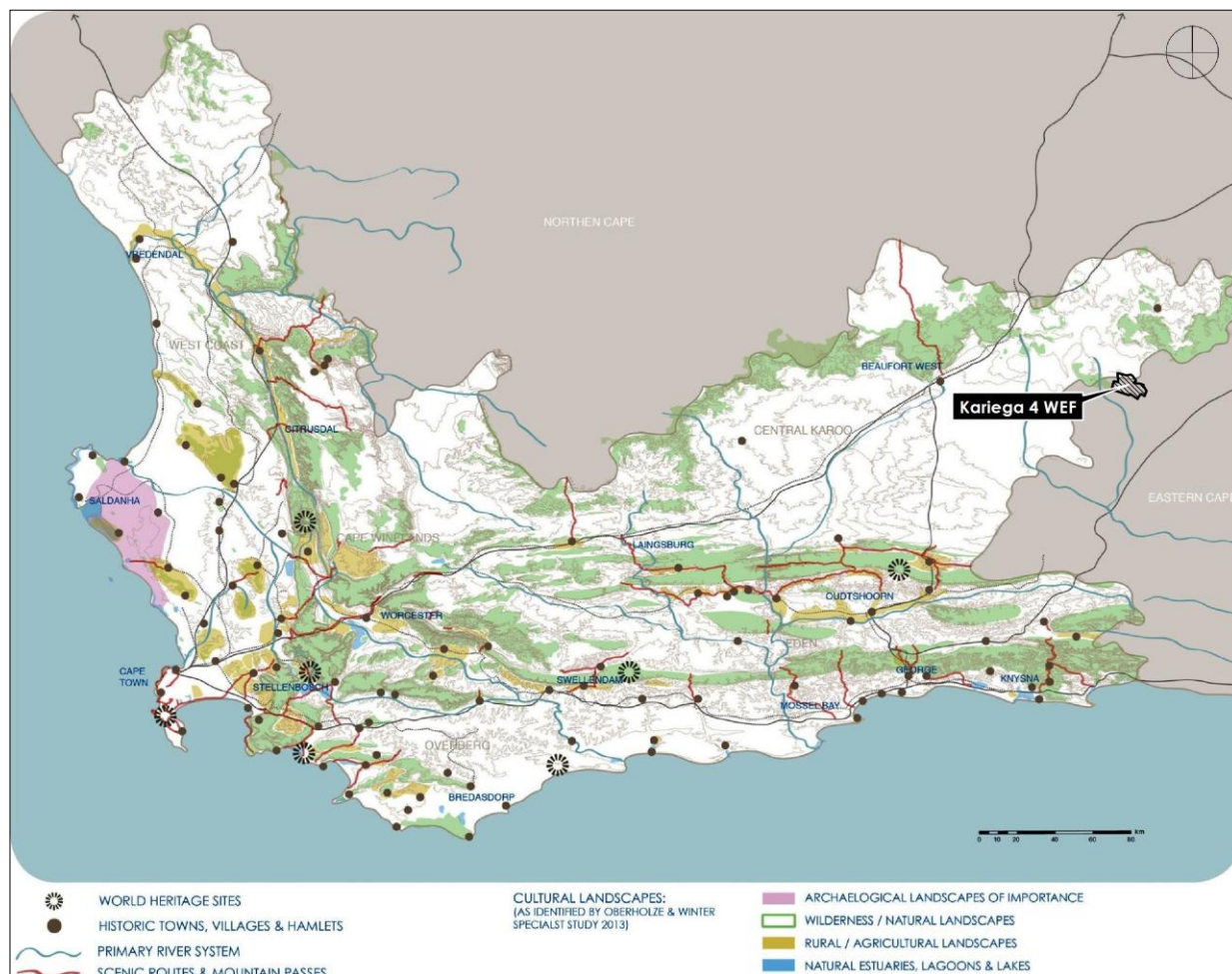
The PSDF sets out the basis for addressing the Western Cape's spatial agenda, it is a framework plan which allows functional regions or municipalities to formulate coherent spatial policies and integrated development plans, and which gives greater certainty over future development opportunities.

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 (2014)

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 Kariega 4 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

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 Kariega 4 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 Kariega 4 WEF project supports the principles as contained in the Central Karoo DM Spatial Development Framework.

12.3 Beaufort West Municipality Integrated Development Plan (IDP)

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 Kariega 4 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 (SDF) (2013)

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.

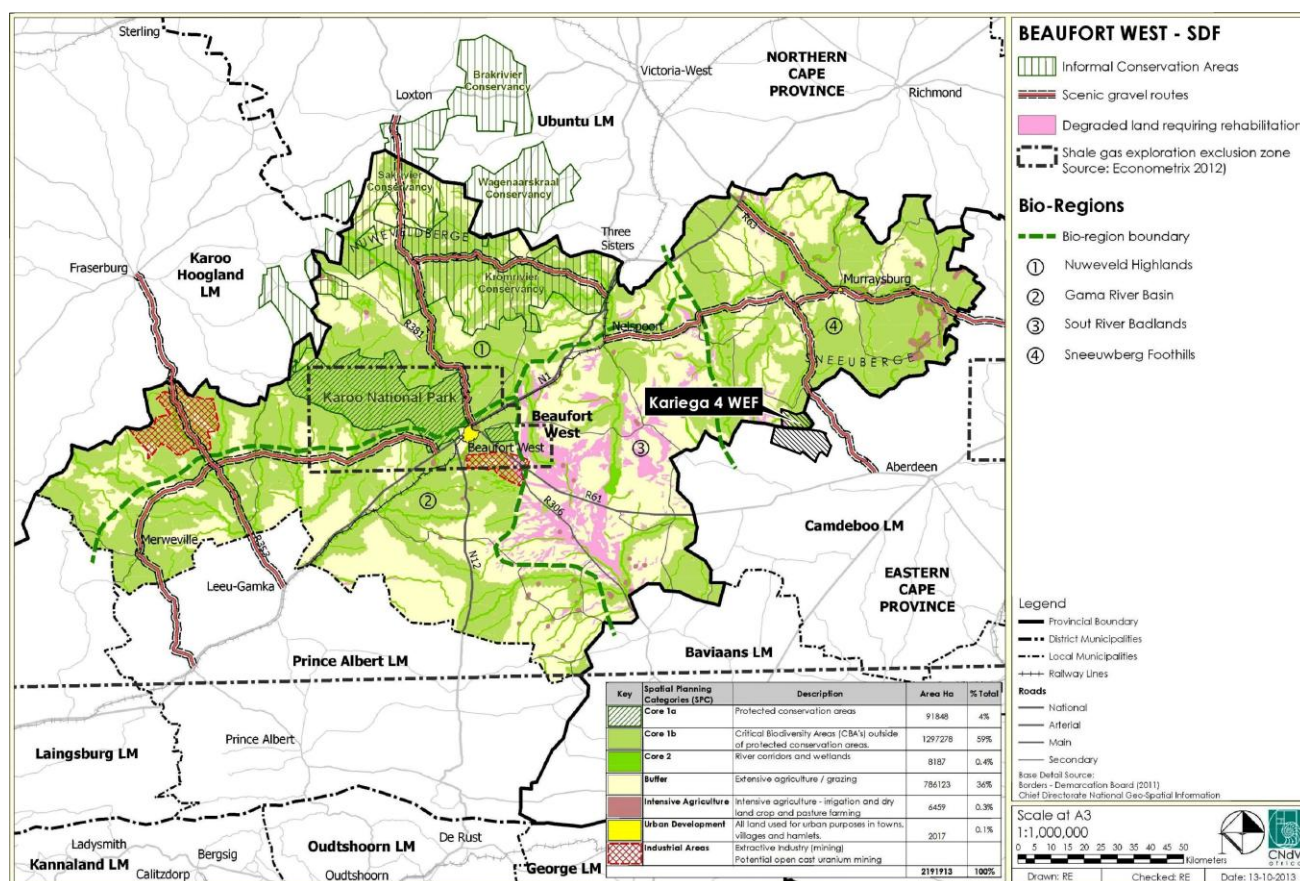
■ Bio-Regions

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 Kariega 4 WEF falls within the Sneeuwberg Foothills Bio-region.

The SDF states that the Sneeuwberg Foothills bio-region has fairly good potential for wind and solar energy projects.



Beaufort West SDF (2013)

- 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 CBAs.

▣ **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 Kariega 4 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, the Department of Forestry, Fisheries & the Environment issued 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 Sneeuwberg Foothills 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 :

"It is the finding of the Visual Impact Assessment report is that, while the combined views of the multiple turbines from multiple projects will significantly change the local landscape character, the proposed development Kariega WEF 4 does not constitute a fatal flaw (with mitigation) for the following reasons:

- *The area is relatively remote, and other than the significant background landforms of the Sleeping Giant and Wolvekop Mountain features of the Camdeboo Mountains, the proposed development site is predominantly flat.*
- *Although tourism is emphasised in the local and regional planning, and the Camdeboo Mountains are significant landscape elements, active tourism in the area is limited to a single farm stay (two dwellings), and the R61 Road as a tourist view corridor.*
- *The landscape planning fit is Medium to High Positive with the site located within the REDZ11 area, and with Renewable Energy (RE) supported by local planning.*

The following preliminary mitigations should inform the layout plan prior to final assessment:

- *Multiple Aircraft Warning Lights (AWL) flashing at the same time from all the turbines is highly likely to generate very strong levels of visual contrast due to the existing dark sky sense of place of the deep rural Karoo landscape context. This should be regarded as a Fatal-Flaw and as such, full AWL mitigation should be a condition of authorisation."*
- The Kariega 4 WEF does fall inside a CBA 1 b area according to the SDF. The Basic Assessment Report confirms that these areas have been avoided and there are no impacts on these CBA areas.
- 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 On-site Substation, Operations & Maintenance Building and Eskom Switching Station Servitude Area 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 (EIA)

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.

An Independent Environmental Assessment Practitioner (EAP) has been commissioned to undertake a detailed Environmental Impact Assessment process.

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.

EnviroAgri (Pty) Ltd consultants was 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 10 : Final Basic Assessment Report (September 2024) (extract only)

13.1 Environmental Authorisation

The Department of Forestry, Fisheries & the Environment granted Environmental Authorisation for the Kariega 4 WEF and Associated Infrastructure, on 10 November 2024 (DFFE Reference Number: 14/12/16/3/3/1/3019).

Refer to Annexure 9 : Environmental Authorisation (14/12/16/3/3/1/3019 dated 10.11.2024)

The Environmental Authorisation (EA) includes conditions to manage implementation and operation of the Kariega 4 WEF. Amongst others, the EA includes :

- Scope of authorisation
- Notification of authorisation and right to appeal
- Commencement of the activity
- Management of the activity
- Frequency and process of updating the EMP
- Monitoring
- Recording and reporting to the Department
- Notification to authorities
- Operation of the activity
- Site closure and decommissioning
- Specific Conditions
- General

13.2 Project Team

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

Discipline	Company
Environmental Assessment Practitioner	EnviroAgri (Pty) Ltd
Agricultural Assessment	Johann Lanz
Avifaunal Assessment	Wild Skies Ecological Services
Bat Assessment	Inkululeko Wildlife Services
Noise Assessment	EARS Enviro Acoustic Research
Landscape/Visual and Flicker Assessment	VRM Africa
Archaeological and Cultural Heritage Assessment	CTS Heritage
Palaeontology Assessment	Natura Viva cc
Geotechnical Assessment	Outeniqua Geotechnical Services
Biodiversity Terrestrial (incl. Plant and Animal Species)	EnviroSci
Biodiversity Aquatic Assessment	EnviroSci
Socio-Economic Assessment	Tony Barbour Environmental Consulting
Traffic Assessment	iWink Consulting
Town Planning Consultant	Urban Dynamics EC

13.3 Summary of Impact Assessment

The table provides a Summary of the cumulative impact significance for the Kariega 4 Wind Energy Facility within the project site. Note that the table below is a summary only and the Final Environmental Impact Assessment Report and Specialist Studies should be consulted.

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Social Employment and business creation opportunities during the construction phase	Creation of employment and business opportunities, and opportunity for skills development and on-site training.	Minor (+)	Moderate (+)				
Social Impacts on family structures and social networks	Impacts on family structures and social networks associated with the presence of construction workers	Moderate (-)	Minor (-)				
Social Impact of influx of job seekers	Potential impacts on family structures, social networks and community services associated with the influx of job seekers	Minor (-)	Minor (-)				
Social Impact on safety of farmers and farm workers, livestock and damage to farm infrastructure	Risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site	Minor (-)	Minor (-)				
Social Impact of grass fires on farming operations	Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	Minor (-)	Minor (-)				
Social Nuisance related construction impacts	Potential noise, dust and safety impacts associated with construction related activities	Minor (-)	Minor (-)				
Social Loss of farmland	Loss of farmland due establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc.	Moderate (-)	Minor (-)				
Social Improve energy security and support renewable energy	Development of infrastructure to improve energy security and support the renewable sector			Major (+)	Major (+)		
Social Employment and business opportunities	Creation of employment and business opportunities associated with the operational phase			Minor (+)	Moderate (+)		
Social Income for affected landowners	Generate additional income for affected landowners to reduce vulnerability of farming to climate change etc.			Moderate (+)	Major (+)		

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Social Socio-economic development opportunities	Socio-economic development opportunities and investment linked to revenue from renewable energy project			Moderate (+)	Major (+)		
Social Visual impact on sense of place	Visual impact on sense of place associated with renewable energy facility			Moderate (-)	Moderate (-)		
Social Impact on property values	Impact on property values associated with visual impacts			Minor (-)	Minor (-)		
Social Impact on tourism	Impact on tourism associated with visual impacts			Minor (-)	Minor (-)		
Social Cumulative impact on sense of place	Cumulative impact on sense of places associated with one or more renewable energy facilities			Moderate (-)	Moderate (-)		
Social Cumulative impact on local services and accommodation	Cumulative impact on local services and accommodation			Moderate (-)	Minor (-)		
Social Cumulative impact on local economy	Creation of socio-economic opportunities associated with establishment of numerous renewable energy facilities in the DBNLM			Moderate (+)	Major (+)		
Social Impact of decommissioning	Loss of jobs and economic opportunities associated with decommissioning					Minor (-)	Minor (-)
Agriculture Occupation of land by the development infrastructure	Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime. As discussed above, the small and widely distributed nature of the agricultural footprint of the facility means that only an insignificant proportion of the available agricultural land is impacted in this way	Minor (-)	Minor (-)	Minor (-)	Minor (-)	Minor (-)	Minor (-)
Agriculture Soil erosion and degradation	Erosion can occur because of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations.	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)		
Agriculture Increased financial security for farming operations	Reliable and predictable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.	Moderate (+)	Moderate (+)	Moderate (+)	Moderate (+)		

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Agriculture Improved security	Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.			Moderate (+)	Moderate (+)		
Agriculture Cumulative agricultural impacts.	Cumulative agricultural impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect agricultural production.	Minor (-)	Minor (-)	Minor (-)	Minor (-)	Minor (-)	Minor (-)
Geotechnical Soil degradation	Construction phase soil disturbance, degradation by removal, mixing, compaction, etc due to the construction of infrastructure.	Moderate (-)	Moderate (-)				
Geotechnical Soil degradation	Construction phase degradation due to pollution by contaminants used on site during construction (fuel, oil, chemicals, cement).	Minor (-)	Minor (-)				
Geotechnical Soil erosion	Construction phase erosion by wind and/or water of loosened soil in construction areas.	Moderate (-)	Moderate (-)				
Geotechnical Siltation	Degradation of watercourses due to siltation (silt-loading) due to erosion from site.	Moderate (-)	Moderate (-)				
Geotechnical Dust pollution	Dust pollution due to wind erosion from site.	Minor (-)	Minor (-)				
Geotechnical Reduced demand for non-renewable energy sources	Reduction in the in extraction of non-renewable energy sources, such as coal, uranium, etc. due to the provision of renewable energy from the project			Major (+)	Major (+)		
Visual Wind-blown dust	Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local farms around the site and along the access roads.	Minimal (-)	Minimal (-)				
Visual Topsoil loss	Topsoil excavated from the site should be stockpiled and utilised for rehabilitation of the site after construction.	Minor (-)	Minor (-)				
Visual Buildings, structures and finishing	Buildings painted bright colours can increase the visual presence of the structures in a rural landscape, creating higher levels of visual contrast and attracting the attention of the casual observer.	Minor (-)	Minor (-)				
Visual Litter	Litter has the potential to degrade landscape character and can be contained by fencing around the construction camp/ laydown.	Minor (-)	Moderate (-)				
Visual Security Fencing	Long fencing lines has the potential to be visually dominating, degrading the rural landscape sense of place.	Moderate (-)	Minor (-)				
Visual Soil Erosion	In areas where construction has taken place on steeper slopes, soil erosion measures need to be implemented.	Minor (-)	Minimal (-)				
Visual Security Light Spillage at night	Light spillage from security lighting of structures can significantly increase the visual impact of a project in a rural landscape in a dark-sky context.	Moderate (-)	Minimal (-)				

Impact title	Impact description	Construction	Operation		Decommissioning		
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Visual Un-necessary roads	Unnecessary roads have the potential to create a visual disturbance long after the usage as past.	Minor (-)	Minimal (-)				
Visual Construction of turbines	The construction of turbines usually requires a number of large cranes that are very visible in the regional landscape.	Moderate (-)	Moderate (-)				
Visual Laydown, Site Camp and Batching	Construction of the Preferred Alternative for the Laydown, Site Camp and Batching Plant.	Minor (-)	Minor (-)	Minor (-)	Minor (-)		
Visual BESS & Substation Infrastructure	Construction of the BESS and Substation	Minor (-)	Minor (-)	Minor (-)	Minor (-)		
Visual Soil sterilisation by compaction	Compaction of larger areas can result in soil sterilisation and landscape degradation post construction.	Minor (-)	Minimal (-)	Minor (-)	Minimal (-)		
Visual Static and moving white turbines with red or black single blade tip colour.	Change to rural karoo landscape to wind farm landscape due to the presence of large and moving/ static turbines.			Major (-)	Major (-)		
Visual Aircraft Warning Lights at Night.	AWL lights at night have the potential to significantly detract from the 'dark-sky' sense of place of the rural landscape.			Major (-)	Moderate (-)		
Visual Security Light Spillage at night.	Light spillage from security lighting of structures can significantly increase the visual impact of a project in a rural landscape in a dark-sky context.			Major (-)	Moderate (-)		
Visual Old turbine blade dumping	The dumping of old turbine blades on site has the potential to significantly degrade the local landscape character.			Moderate (-)	Minimal (-)		
Visual Abandoning of old structures	Old, unused structures have the potential to significantly degrade the landscape character.					Moderate (-)	Minor (+)
Visual Abandoning of old towers and blades.	Old towers have the potential to significantly degrade the landscape character.					Major (-)	Minor (+)
Visual Cumulative, intervisibility during the day	Intervisibility during the day of all the Kariega WEF projects as well as the other wind farms to the southeast.	Major (-)	Major (-)	Major (-)	Major (-)	Major (-)	Major (-)

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Visual Cumulative, AWL intervisibility during the night	Intervisibility of the AWL during the night of all the Kariega WEF projects as well as the other wind farms to the southeast.	Major (-)	Moderate (-)	Major (-)	Moderate (-)	Major (-)	Moderate (-)
Shadow Flicker Shadow Flicker	The shadow flicker effects generated from the rotating turbine blades on adjacent receptor occupied dwellings.			Minimal (-)	Minimal (-)		
Noise Increase in daytime ambient sound levels	Increase in noise levels at NSR due to construction of access roads.	Moderate (-)	Minimal (-)				
Noise Increase in daytime ambient sound levels	Increase in noise levels at NSR due to traffic.	Minor (-)	Minor (-)				
Noise Increase in daytime ambient sound levels	Increase in daytime noise levels at NSR due to construction near NSR.	Minimal (-)	Minimal (-)				
Noise Increase in night-time ambient sound levels	Increase in night-time noise levels at NSR due to construction near NSR.	Minor (-)	Minimal (-)				
Noise Increase in daytime ambient sound levels	Increase in daytime noise levels at NSR due to operation of wind turbines near NSR.			Minor (-)	Minimal (-)		
Noise Increase in night-time ambient sound levels	Increase in night-time noise levels at NSR due to operation of wind turbines near NSR.			Moderate (-)	Minor (-)		
Noise Increase in daytime ambient sound levels	Increase in daytime noise levels at NSR due to decommissioning activities near NSR.					Minimal (-)	Minimal (-)
Noise Cumulative increase in night-time ambient sound levels	Increase in night-time noise levels at NSR due to operation of wind turbines near NSR from various WEFs in the vicinity of Kariega.					Major (-)	Minor (-)
Avifauna Destruction of habitat	Bird habitat is altered or destroyed during the construction of the facility.	Moderate (-)	Moderate (-)				
Avifauna Disturbance of birds	Birds resident and/or breeding on and near site are disturbed during construction. This may impact on foraging, resting and/or breeding activities.	Moderate (-)	Minor (-)				

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Avifauna Disturbance of birds	Birds disturbed during operation of the facility. This may impact on foraging and /or breeding activities.			Minor (-)	Minor (-)		
Avifauna Displacement of birds from site	Birds are displaced from site, which has territorial and energy efficiency implications. Either having to find and secure new territories, or flying further to and from feeding and breeding sites.			Minor (-)	Minor (-)		
Avifauna Turbine collision fatality	Birds are killed through collision with turbine blades.			Major (-)	Moderate (-)		
Avifauna Collision of birds with overhead lines	Birds in flight do not see overhead powerlines and may consequently collide with overhead powerlines.			Major (-)	Minor (-)		
Avifauna Birds electrocution on overhead lines	Large birds perching on pylons bridge the critical clearances and short circuit the line thereby being electrocuted.			Major (-)	Minimal (-)		
Avifauna Disturbance of birds	Birds resident and/or breeding on and near site are disturbed during decommissioning. This may impact on foraging, resting and/or breeding activities.					Moderate (-)	Minimal (-)
Avifauna Cumulative impact on avifauna	Cumulative impact on avifauna through destruction of habitat and bird fatalities through collision with wind turbines.	Major (-)	Moderate (-)	Major (-)	Moderate (-)	Major (-)	Moderate (-)
Bats Roost disturbance or destruction	During construction of infrastructure for the WEF, potential bat roosts (roosting bats and/or roost sites) in trees, buildings, or elsewhere could be disturbed or destroyed (during possible tree felling, demolishing of old buildings, blasting) if overlooked and /or not adequately avoided.)	Moderate (-)	Minor (-)				
Bats Destruction, degradation, and fragmentation of and displacement from foraging habitat	Destruction, degradation, and fragmentation of and displacement from foraging habitat	Major (-)	Moderate (-)	Major (-)	Moderate (-)	Major (-)	Moderate (-)
Bats Bat fatalities from collision with turbines, and potential population declines.	Bat fatalities from collision with turbines, and potential population declines			Major (-)	Moderate (-)		
Bats Decline or loss of bat ecosystem services	Decline or loss of bat ecosystem services	Moderate (-)	Minimal (-)	Moderate (-)	Minimal (-)	Moderate (-)	Minimal (-)
Bats	Cumulative impact on bats from multiple WEFs in the region	Major (-)	Moderate (-)	Major (-)	Moderate (-)	Major (-)	Moderate (-)

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Cumulative impact on bats from multiple WEFs in the region							
Bats Cumulative impact of known renewable energy projects within a 100km radius	Cumulative impact of known renewable energy projects within a 100km radius	Severe (-)	Major (-)	Severe (-)	Major (-)	Severe (-)	Major (-)
Terrestrial Biodiversity Loss of species of special concern (SSC)	Potential impact on Protected Plant species, observed within the site listed on a Provincial level	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Terrestrial Biodiversity Damage and disturbance of the habitats rated as Very High Sensitivity	Potential impact very sensitive habitats that are also associated with habitat requirements for two Endangered faunal species	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Terrestrial Biodiversity Loss of ecosystem services, and or habitats	Loss of ecosystem services, and or habitats that would result in habitat fragmentation, especially those included in any Biodiversity Conservation plans as Critical Biodiversity areas or Ecological Support Areas. This in turn could also lead to habitat fragmentation	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Terrestrial Biodiversity Displacement of any animals because of any disturbance or habitat loss.	Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to construction vehicle traffic.	Major (-)	Minor (-)			Major (-)	Minor (-)
Terrestrial Biodiversity Displacement of any animals because of any disturbance or habitat loss	Displacement of any animals because of any disturbance or habitat loss. This includes animal mortalities related to construction vehicle traffic			Major (-)	Minor (-)		
Terrestrial Biodiversity Cumulative impacts on terrestrial biodiversity	All of the projects have indicated that their intention with regard to mitigation, i.e. selecting the best possible sites to minimise the local and regional impacts. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects such clearing high sensitivity areas and or impacting sensitive species.	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)
Aquatic Biodiversity Damage and disturbance of the habitats rated as High Sensitivity associated with aquatic / alluvial features.	Damage and disturbance of the habitats rated as High Sensitivity associated with aquatic / alluvial features– Direct Impact Potential impact very sensitive habitats that are also associated with habitat requirements for two Endangered faunal species (Riverine Rabbit & Bullfrog)	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Aquatic Biodiversity Loss of ecosystem services, and or habitats that would result in habitat fragmentation.	Loss of ecosystem services, and or habitats that would result in habitat fragmentation, especially those included in any Biodiversity Conservation plans as Critical Biodiversity areas or Ecological Support Areas. This in turn could also lead to habitat fragmentation. The potential impact on ecosystem services still exists, due to clearing of vegetation, however all CBAs have been avoided. For this purpose, the footprints have avoided high ecological value areas, while keeping the overall footprint condensed	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Aquatic Biodiversity Impact on all watercourse through the possible increase in surface water runoff	Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within the aquatic systems, which are currently ephemeral, i.e. aquatic vegetation species composition changes, which then results in habitat change / loss.	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)
Aquatic Biodiversity Impact on localised surface water quality.	During both preconstruction, construction and, to a limited degree, the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope via the watercourses.	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)
Aquatic Biodiversity Impacts on FEPA quinary catchment and Ecological Support Areas.	A small portion of the site falls within a FEPA quinary catchment and Ecological Support Areas. Although the development would potentially have negative impacts on the riparian environment through disturbance and changes to water quality downstream of the site as a result of erosion, pollution and other forms of disturbance and associated degradation of the freshwater ecosystems of the site, these negative impacts can be well-mitigated.	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Aquatic Biodiversity Cumulative impacts on aquatic biodiversity.	All of the projects have indicated that their intention with regard to mitigation, i.e. selecting the best possible sites to minimise the local and regional impacts or improving the drainage or hydrological conditions within these rivers, and therefore the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects such as stormwater management, and that flows within these systems are sporadic.	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)	Moderate (-)	Minor (-)
Heritage Negative Impacts to the Cultural Landscape	The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development.	High (-)	High (-)	High (-)	High (-)	High (-)	High (-)
Heritage Destruction of significant archaeological heritage	The area proposed for development is known to conserve heritage resources of archaeological significance that may be impacted by the proposed development.	High (-)	Moderate (-)				

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Heritage Destruction of significant palaeontological heritage	The area proposed for development is known to conserve heritage resources of palaeontological significance that may be impacted by the proposed development.	Minor (-)	Minor (-)				
Traffic Construction and Decommissioning phase traffic impacts	Temporary increase in traffic, noise and dust pollution associated potential traffic Potential damage to road surfaces caused by construction vehicles.	Moderate (-)	Minor (-)			Moderate (-)	Minor (-)
Traffic Traffic Impact due to maintenance and staff trips	Traffic Impact due to maintenance and staff trips for the length of operation.			Minimal (-)	Minimal (-)		
Traffic Cumulative construction and decommissioning phase traffic impacts	Additional Traffic Impact due to all authorized renewable energy projects being developed at the same time.	Major (-)	Moderate (-)			Major (-)	Moderate (-)

13.4 Environmental Impact Statement

With mitigation measures in place post mitigation impacts are anticipated to be minimal to moderate negative significance. Two impacts remain major negative post mitigation: 1. Is the visual impact which will result in the change to rural karoo landscape to wind farm landscape due to the presence of large and moving/ static turbines and this coincided with the cumulative intervisibility during the day of all the Kariega WEF projects as well as the other wind to the southeast. This is not seen as a project flaw since the project is situated within a landscape located within the REDZ 11 area and with RE supported by local planning. 2. The cumulative impact of known renewable energy projects within a 100km radius of the project may result in major negative impact post mitigation on bats. Without diligent monitoring and mitigation of bat fatalities and other impacts at all WEFs in and around the Beaufort West REDZ 11, their potential cumulative impact on bat habitats, populations, and ecosystem services (with proper bat fatality mitigation using turbine curtailment and other secondary mitigation measures, and diligent bat fatality monitoring and adaptive mitigation, may the cumulative impact of these WEFs on bats) may be major negative significance with a moderately-detrimental consequence. This was not seen as a project flaw given that mitigation measures are strictly enforced by the Kariega WEF cluster.

13.5 Conclusion & Way Forward

The following extract from the Basic Assessment Report provides an overall conclusion and way forward that was undertaken for the Kariega 4 Wind Energy Facility :

"Based on the information presented within this fBAR and associated annexures, including the assessment of project specific and cumulative impacts, it is recommended that the proposed WEF be granted a positive Environmental Authorisation. The WEF site has gone through numerous assessments and refinements therefore the confidence in this assessment and the outcome thereof is high. Moreover, the level of residual impact directly related to the activity assessed is acceptable post mitigation. We also request that the layout in terms of the allocated buffers and EMPr(s) be approved as final, provided the Environmental Authorisation is granted. The final detailed design layout map will be provided to DFFE prior to construction with the notification of commencement of construction and appointment of the ECO."

14. Title Deed Conditions

The following title deeds are applicable to the farm portion :

Property Description	Title Deed No.
The Remainder of the Farm Sarels Rivier No. 141	T13773/1998

A Conveyancing Certificate confirms that there are no restrictive conditions in the Title Deeds that need to be removed to enable implementation of the development proposal.

Refer to Annexure 6 : Title Deed

Refer to Annexure 7 : Conveyancing Certificate

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

15. Department of Agriculture

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 (Act 70 of 1970) (SALA).

An application for consent to utilise the farm portion for Renewable Energy purposes was submitted to the Department of Agriculture for comment and support and the Department confirmed that it has no objection to the proposed change in land use for the construction and operation of the WEF.

Refer to Annexure 13 : Department of Agriculture Letter of No Objection

A final approval by the Department of Agriculture, in terms of SALA, for the servitudes and long term lease areas will be obtained after the Beaufort West Municipality issues the relevant SPLUMA approval.

16. Land Claims Commissioner (LCC)

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

Refer to Annexure 12 : 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 Areas 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 Kariega 4 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 Kariega 4 WEF, east of Beaufort West in the Western Cape, demonstrates this commitment towards renewable energy and green efficiencies.

The development of Kariega 4 WEF has been assessed by a team of professionals and based on the outcome of the Basic Assessment Report (BAR) and specialist studies, a positive Environmental Authorisation by the Department of Forestry, Fisheries & the Environment has been obtained.

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 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.
- Construction, maintenance and operation phases will be strictly monitored through implementation of the Environmental Management Programmes (EMPrs).
- Implementation of the Kariega 4 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 proposed development obtained a positive Environmental Authorisation.
- The employment opportunities associated with the Kariega 4 Wind Energy Facility is approximately:
 - 250 during Construction phase and
 - 20 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.