FINAL BASIC ASSESSMENT REPORT FOR DECISION FOR THE WESTERN CAPE WIND ENERGY FACILITY (WEF), SWELLENDAM MUNICIPALITY, WESTERN CAPE

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October 2021
DFFE REFERENCE NO:
14/12/16/3/3/1/2437

APPLICABLE LEGISLATION	COMPETENT AUTHORITY REFERENCE NUMBER/S
NEMA EIA Regulations (2017) (as amended)	DFFE Reference No.: 14/12/16/3/3/1/2437
WULA in terms of Section 21 of the National Water Act (Act No. 39 of 1998)	The water use activities associated with the proposed project would fall within the ambit of the General Authorisations for Section 21(c) and (i) water uses.
National Heritage Resource Act (SAHRA)	Application being processed
Report Title	Final Basic Assessment Report (BAR) for Decision for the Western Cape Wind Energy Facility (WEF), Swellendam Municipality, Western Cape.
Author (EAP)	Johann Kilian (Terramanzi Group (Pty) Ltd)
Specialist Sub-Consultants	Agricultural Assessment - Agriformatics C/O Francois Knight Avifaunal – Chris van Rooyen Consulting C/O Chris van Rooyen Bat - Arcus C/O Ashlin Bodasig Ecological - Nick Helme Botanical Surveys C/O Nick Helme Freshwater - BlueScience C/O Toni Belcher Heritage - CTS C/O Jenna Lavin Noise - dBAcoustics C/O Barend van der Merwe Social – Multipurpose Business Solutions C/O Jonathan Bloom Traffic - ITS C/O Christoff Krogscheepers Visual - Environmental Planning and Design C/O Jon Marshal
Client	Western Cape Wind Farm (Pty) Ltd C/O Jason Cope
Report Version	Final Basic Assessment Report for Decision
Submission Date	10 November 2021

Please use the following as a reference for this Report:

Terramanzi Group Project Number: 200701

Project Title: Final Basic Assessment Report (BAR) for Decision for the Western Cape Wind Energy Facility (WEF), Swellendam Municipality, Western Cape

Purpose of this Document:

The Applicant, Western Cape Wind Farm (Pty) Ltd, is planning to develop the Western Cape Wind Energy Facility (WEF) on a site approximately 15km southwest of Swellendam in the Western Cape. The project proposes the installation of up to 24 wind turbine generators (WTG), each with a nominal generation capacity of up to 5.6MW and a total combined generation capacity of up to 140MW for national distribution and which would contribute to targets for renewable energy generation in South Africa and the Province. As this project is situated in the Overberg Renewable Energy Development Zone (REDZ) as defined by the Department of Forestry, Fisheries and Environment (DFFE), a Basic Assessment (BA) Process is required to apply for Environmental Authorisation. This Final BA Report has been prepared in accordance with the NEMA EIA Regulations (2014, as amended) and is accordingly circulated for Public Comment.

It is anticipated that the Western Cape WEF will comprise of the following components:

- Up to 24 WTGs with a total output of 140MW,
- Generation capacity of up to 5.6MW each,
- Each WTG will consist of a transformer, steel tower, hub, nacelle (gear box), and three rotor blades,
- Tower height of up to 120m,
- Total height up to a max of 200m,
- Battery Energy Storage Systems (BESS) associated with the WEF,
- 24 concrete foundations to support the turbine towers (15m x 15m x 2.5m in depth),
- 24 temporary turbine laydown areas of 80m x 30m (57 600m^2),
- A 132kV substation with high voltage (HV) yard footprint of approximately 100m x 100m (1000m2),
- Underground cabling between the WEF's components following existing roads,
- Two 132kV Overhead Powerline (OHPL) options connecting the WEF to an existing ESKOM network grid,
- Internal access roads (10m wide and 40km long) linking the wind turbines and the infrastructure on the site, and
- Operations and maintenance building including a storage facility with a footprint of 40m x 20m (800m2) for maintenance and storage purposes.

Based on the information presented in this BAR, as informed by the statutory requirements, independent expert studies, public consultation, commenting authorities and the competent authority, the findings of this Basic Assessment indicate that the project, in the form of the preferred alternative, (read strictly in conjunction with the mitigation measures stipulated in Section 18.2 of this BAR as well as the attached EMPr, which must form part of the conditions of the EA) **will not result in unacceptable negative impacts.**

As part of this Basic Assessment Report (BAR) process, a number of specialist environmental impact assessments have been undertaken by independent experts, in terms of the National Environmental Management Act (107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (2014, as amended), with a view to providing impacts assessment findings and recommendations to inform this BAR and also to assess the potential impacts associated with the proposed Western Cape WEF and associated infrastructure on the receiving environment.

As per the requirements of the NEMA EIA Regulations (2014, as amended), this BAR has been issued for public participation in terms of GNR 326, Regulation 41(b)).

APPLICATION PHASE

The Phase requires the EAP to submit a NEMA Application Form to the Competent Authority in accordance with Regulation 16 of GNR 326 of the NEMA EIA Regulations (2014, as amended)

BASIC ASSESSMENT REPORT PHASE (90 DAYS)

This phase involves detailed site assessments of the Project on the receiving environment and culminates in a reccomendation by the EAP, on the preferred alternative for the Project, based on the development opportunities and constraints identified in this phase.

This phase typically allows for a 30 day public consultation period.

BASIC ASSESSMENT REPORT (BAR) DECISION PHASE

The BAR findings are submitted to the Competent Authority for a decision for consideration to grant an Environmental Authorisation

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Appendix B – Photographs of the Site

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- Screening Tool Report (STR)
- Site Sensitivity Verification Report (SSVR)
- Agricultural Assessment - Agriformatics C/O Francois Knight – July 2021
- Avifaunal – Chris van Rooyen Consulting C/O Chris van Rooyen – August 2021
- Bat - Arcus C/O Ashlin Bodasig – June 2021
- Ecological - Nick Helme Botanical Surveys C/O Nick Helme – July 2021
- Freshwater – BlueScience C/O Toni Belcher – July 2021
- Heritage - CTS C/O Jenna Lavin – August 2021
- Noise - dBAcoustics C/O Barend van der Merwe – July 2021
- Social – Multipurpose Business Solutions C/O Jonathan Bloom– July 2021
- Traffic - ITS C/O Christoff Krogscheepers– July 2021
- Visual - Environmental planning and Design C/O Jon Marshal– July 2021

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Appendix G – Competent Authority Correspondence:

- PP Plan Request for Approval – 11 August 2021
- (Pre-Application meeting not required) Request for Pre-Application Meeting – Western Cape WEF- Basic Assessment process.

Appendix H – Other Permits and Information

Appendix I – EAP Curriculum Vitae

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1 DEFINITIONS AND TERMINOLOGY REFERRED TO IN THIS REPORT

PLEASE REFER TO ANNEXURE I FOR THE DEFINITIONS AND TERMINOLOGY REFERRED TO IN THIS REPORT

2 PROJECT OVERVIEW AND ENVIRONMENTAL IMPACT STATEMENT

*In accordance with **Appendix 1 Regulation 3(l) of GN No. R. 326 of the NEMA EIA Regulations (2017 as amended)**:*

An environmental impact statement which contains:

__3(l) i__ – A summary of the key findings of the environmental impact assessment;
__3(l) ii__ – A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and
__3(l) iii__ - A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.

2.1 PROJECT OVERVIEW

The Applicant, Western Cape Wind Farm (Pty) Ltd is planning to develop the Western Cape Wind Energy Facility (WEF) on a site approximately 15km southwest of Swellendam in the Western Cape. The Applicant proposes the installation of up to 24 wind turbine generators (WTG), each with a nominal generation capacity of up to 5.6MW and a total combined generation capacity of up to 140MW for national distribution and would contribute to targets for renewable energy generation in South Africa and the Province. As this project is situated in the Overberg Renewable Energy Development Zone (REDZ) as defined by the Department of Forestry, Fisheries and Environment (DFFE), a Basic Environmental Assessment is required to apply for Environmental Authorisation.

It is anticipated that the Western Cape WEF will comprise of the following components:

- Up to 24 WTGs with a total output of 140MW,
- Generation capacity of up to 5.6MW each,
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- Internal access roads (approx. 10m wide and approx. 40km long) linking the wind turbines and the infrastructure on the site, and
- Operations and maintenance building including a storage facility with a footprint of 40m x 20m (800m^2) for maintenance and storage purposes.

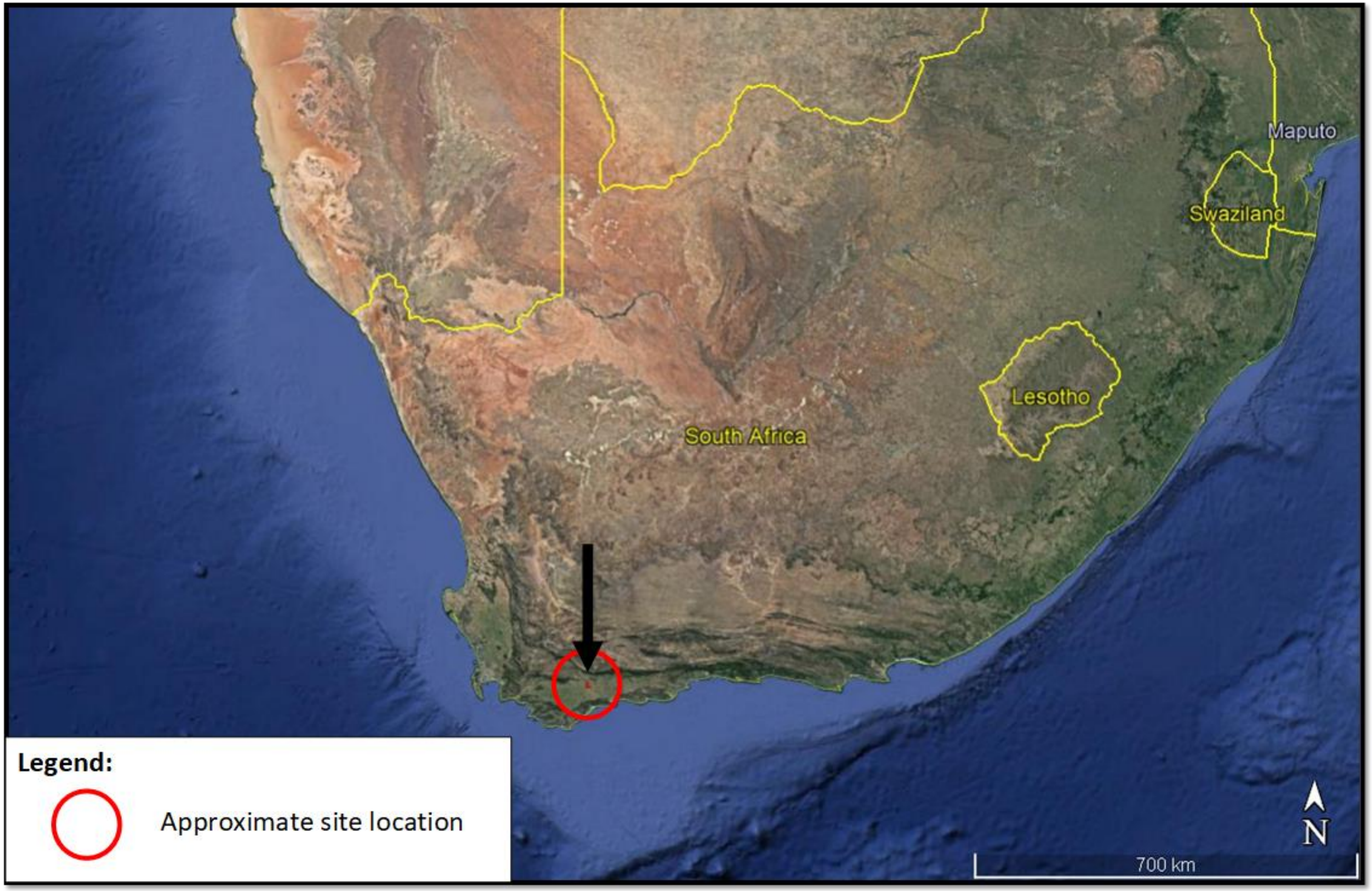


Figure 1.1: This figure shows the location of the proposed Western Cape WEF within a broad geographical context.

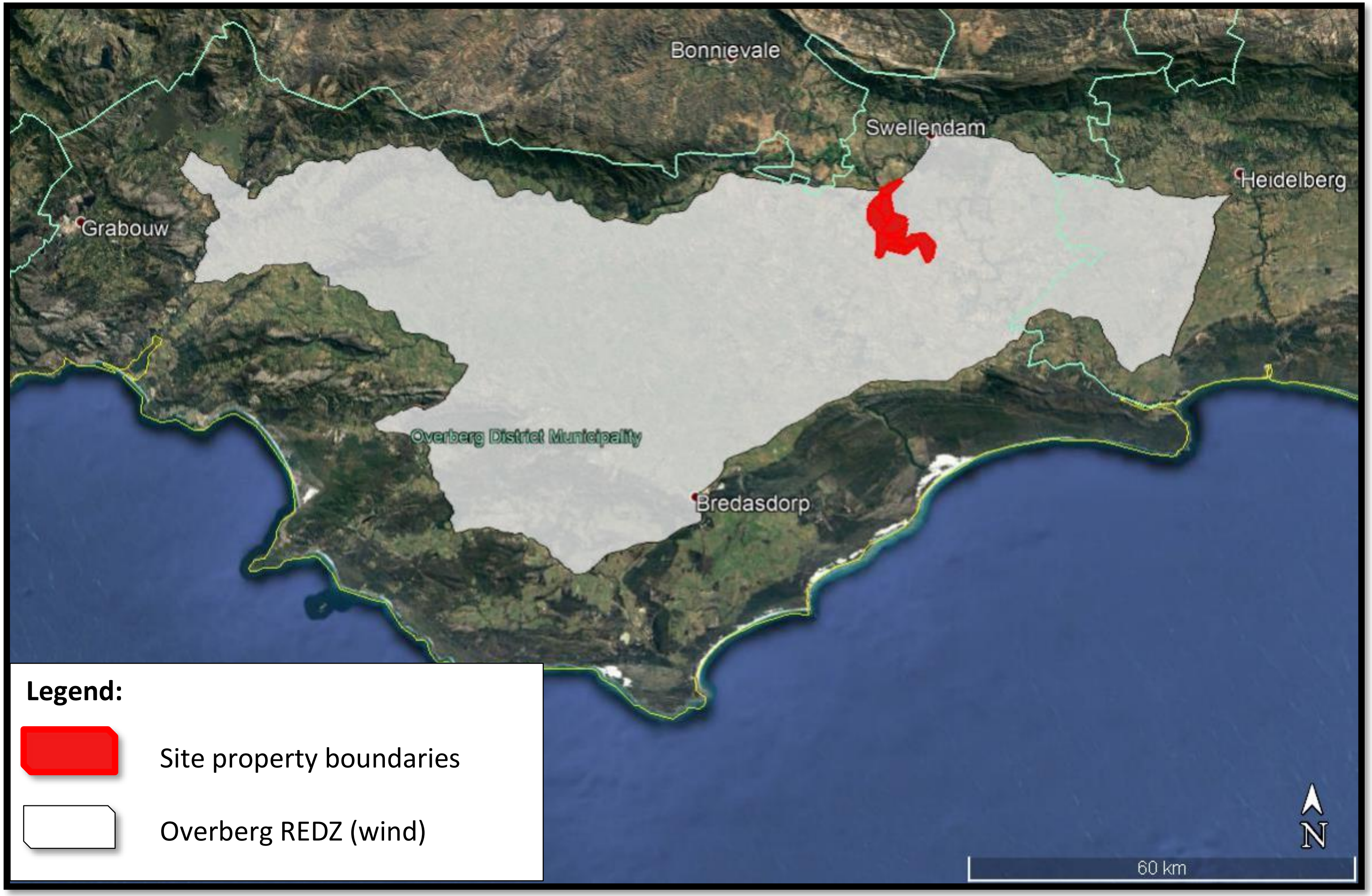


Figure 1.2: This figure shows the regional location of the proposed Western Cape WEF within the Overberg REDZ.

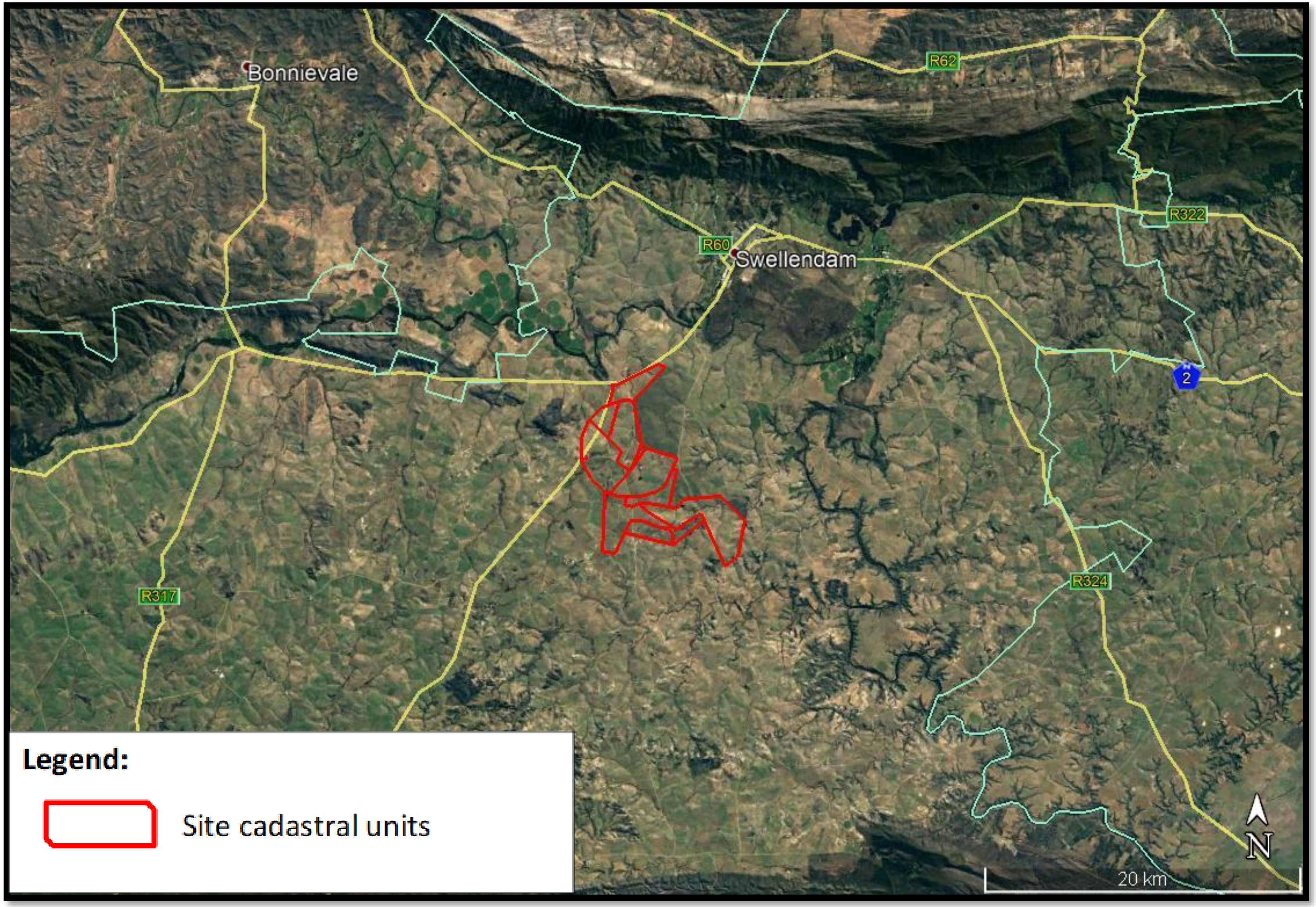


Figure 1.3: This figure shows the local context of the proposed Western Cape WEF.

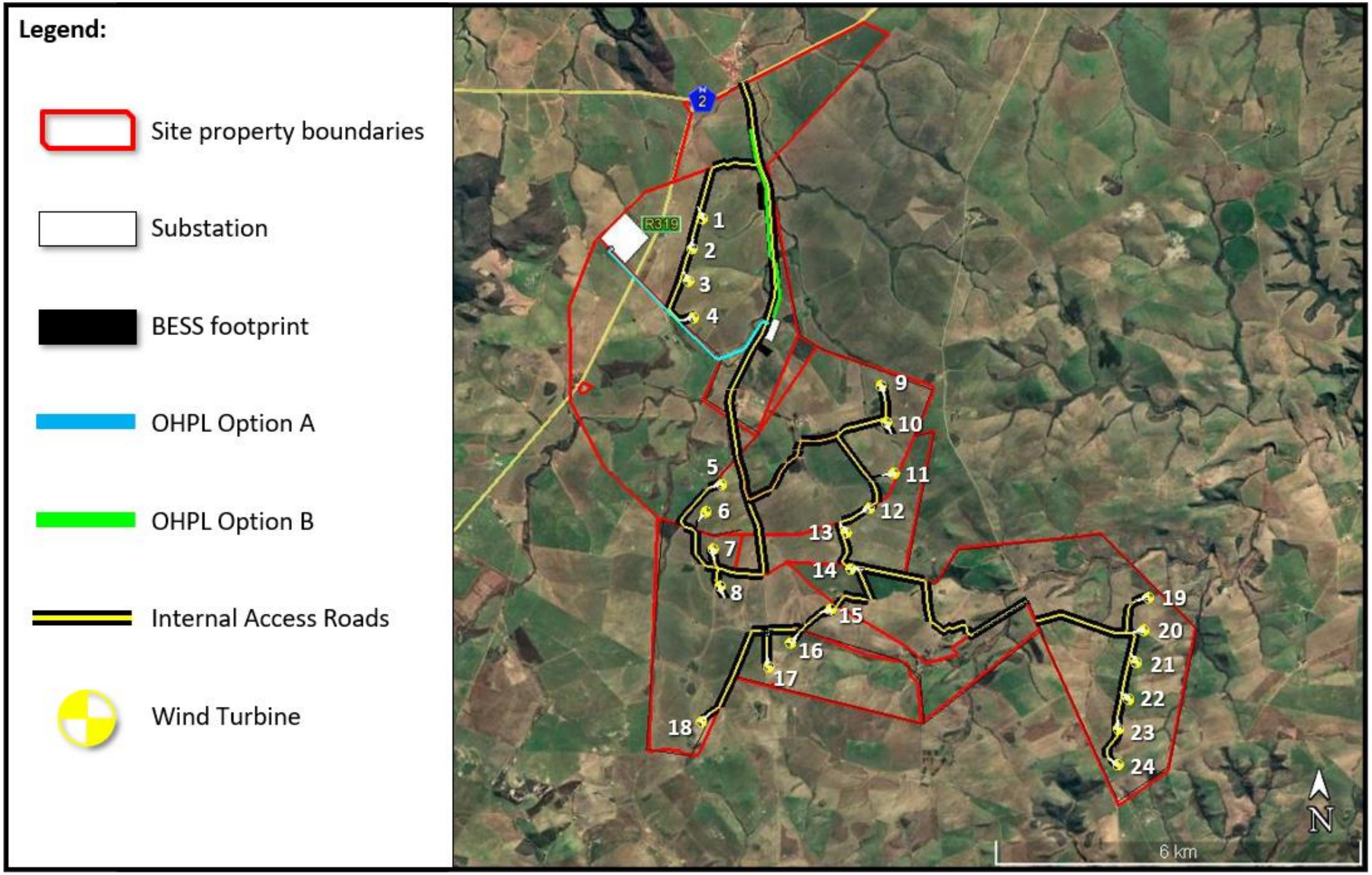


Figure 1.4: Proposed layout for the Western Cape WEF.

2.2 ENVIRONMENTAL PERMITTING PROCESS TO DATE

The Applicant underwent an iterative process to determine the best turbines for the given application, the routing of the overhead powerline, and the positions of the substation and BESS options, which were all informed by the appointed specialists' recommendations, Commenting Authorities (Eskom), and landowners. Based on these recommendations and assessments undertaken by both the EAP and Professional Team, a preferred layout (see Section 9) was designed and assessed against the No-Go Alternative as part of the Basic Assessment process. This Preferred Alternative has been found to be feasible and reasonable.

2.3 SUMMARY OF INDEPENDENT SPECIALIST UNDERTAKEN AS PART OF THIS BASIC ASSESSMENT REPORT

The following specialist assessments were undertaken:

Theme	Specialist	Date of Report
Agricultural	Agri Informatics C/O Francois Knight	July 2021 (updated Aug 2021)
Avifaunal/Bird	Chris van Rooyen Consulting C/O Chris van Rooyen	August 2021
Bat	Arcus C/O Ashlin Bodasig	June 2021 (updated Aug 2021)
Botanical	Nick Helme Botanical Surveys C/O Nick Helme	July 2021
Freshwater	BlueScience C/O Antonia Belcher	July 2021
Heritage	CTS Heritage C/O Jenna Lavin	August 2021
Noise	dBAcoustics C/O Barend J B van der Merwe	July 2021
Socio-Economic	Multipurpose Business Solutions C/O Dr Jonathan Bloom	July 2021
Town Planning	Warren Petterson Planning C/O Andries Du Plessis	July 2021
Transport	Innovative Transport Solutions C/O Christoff Krogscheepers	July 2021
Visual	Environmental Planning and Design C/O Jon Marshall	August 2021

Summaries of the key findings are presented below.

For the full impact please see Section 8 of this report and the Specialist Reports found included in Appendix D.

2.3.1 Agricultural Findings – Agri Informatics C/O Francois Knight

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal. and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from an Agricultural perspective, **provided all mitigation measures are adhered to.**

2.3.1.1 Specialist Findings

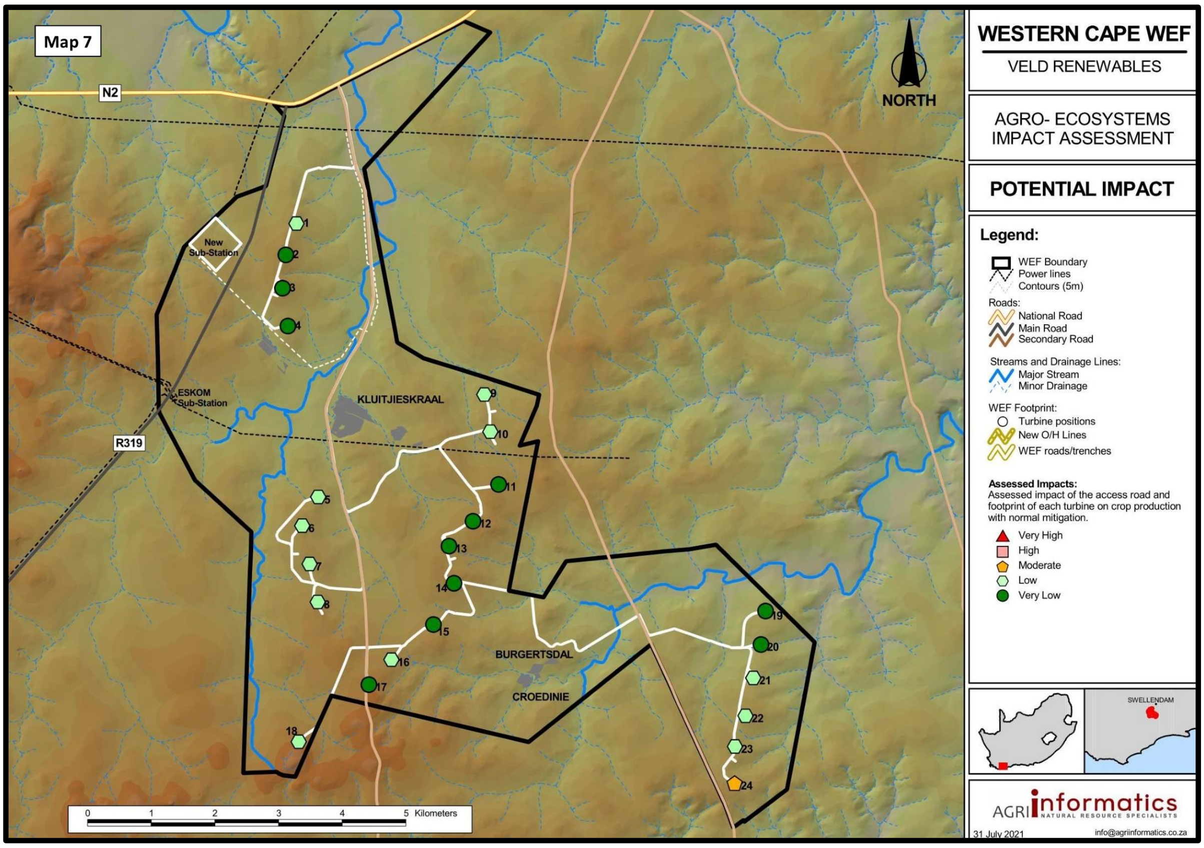


Figure 2.1: This figure shows the potential agricultural impact of the proposed access roads and turbine footprints on crop production with mitigation.

In terms of the Land Capability classification, the footprint of the Wind Energy Facility, including all infrastructure, roads and trenches, is situated in Class 7 or lower. This implies that the sensitivity of the land is ***Low outside of field crop boundaries, but High when placed inside field crop boundaries.***

The marginal winter rainfall (235 mm), dry summers and non-availability of irrigation water, limits the agricultural potential of the study area. Winter cereal crops and lucerne grown as fodder or grazing, in combination with a livestock component – mainly sheep – are the only practical farming system for the area. Wheat (and fodder) yields are moderate due to sub-optimal rainfall in average rainfall years, whilst crop failures can be expected in some dry years. ***The overall agricultural potential of the study area is therefore evaluated as being moderate.***

Provided that all mitigation measures are carefully applied, the **<u>impact on agricultural activities will be low</u>** (See Figure 2.1) and normal agricultural use should be possible for the duration of the operation of the WEF and after decommissioning.

Please refer to the Agricultural Impact Assessment in Appendix D.

2.3.2 Avifaunal Findings – Chris van Rooyen Consulting C/O Chris van Rooyen

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal. and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from an Avifaunal perspective, **provided all mitigation measures are adhered to.**

2.3.2.1 Specialist Findings

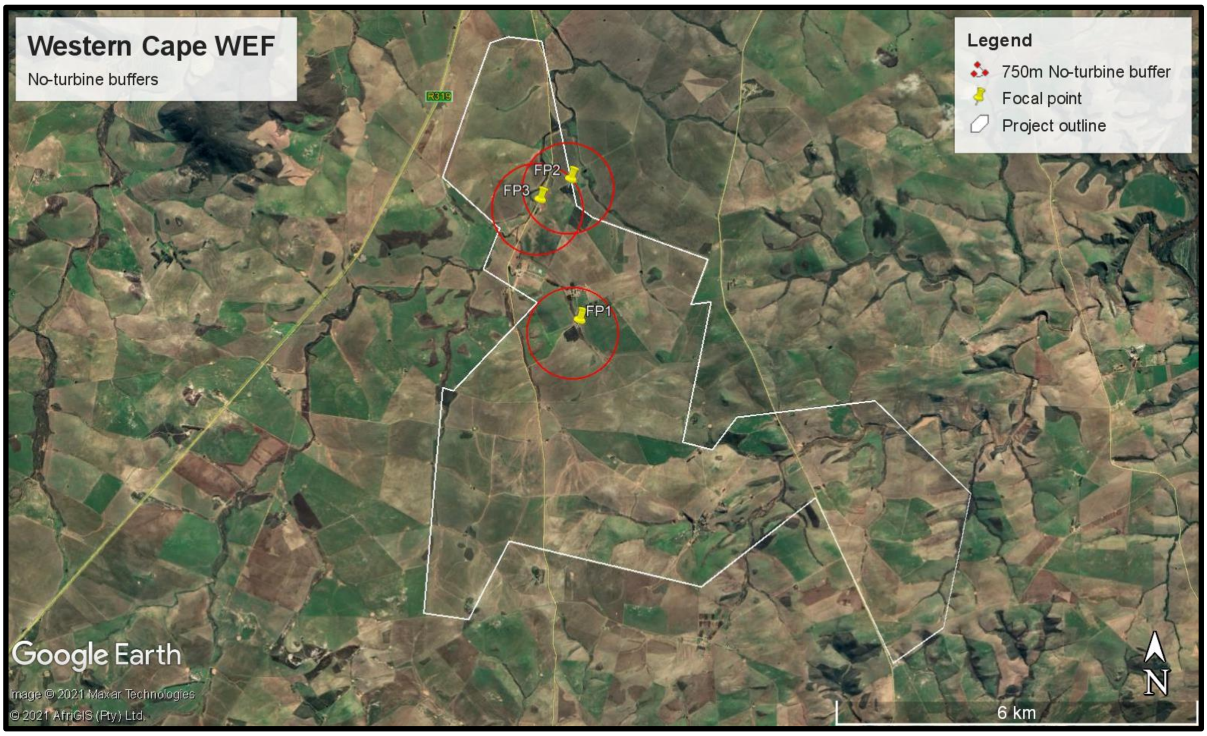


Figure 2.2: Avifaunal sensitivity map of the Western Cape WEF Site, indicating the 750m buffer zones around a number of alien tree stands, which could attract priority avifaunal species.

The proposed Western Cape WEF will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species i.e., mostly bustards such as Karoo Korhaan, Denhams's Bustard, and Blue Crane, although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., raptors and storks are most at risk of all the priority species regularly occurring at the project site. Cape Vultures are also at risk, although they are likely to occur only sporadically.

Several potential impacts on priority avifauna were identified as indicated below:

- *Displacement of priority species due to disturbance linked to construction activities in the construction phase.*
- *Displacement due to habitat transformation in the construction phase.*
- *Collision mortality caused by the wind turbines in the operational phase.*
- *Electrocution in the onsite substation in the operation phase.*
- *Electrocution on the 132kV MV grid connection in the operational phase.*
- *Collisions with the 132kV grid connection in the operational phase.*
- *Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase*

The proposed Western Cape WEF will have a moderate impact on avifauna which, in all instances, could be reduced to a **low impact through appropriate mitigation**. The currently proposed turbine lay-out avoids all the recommended avifaunal turbine exclusion zones and is therefore deemed acceptable. The **development is therefore supported** by the Avifaunal Specialist, provided the mitigation measures listed in this report are strictly applied.

Please refer to the Agricultural Impact Assessment in Appendix D.

2.3.3 Bat Findings – Arcus C/O Ashlin Bodasig

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from a Bat perspective, **provided all mitigation measures are adhered to.**

2.3.3.1 Specialist Findings

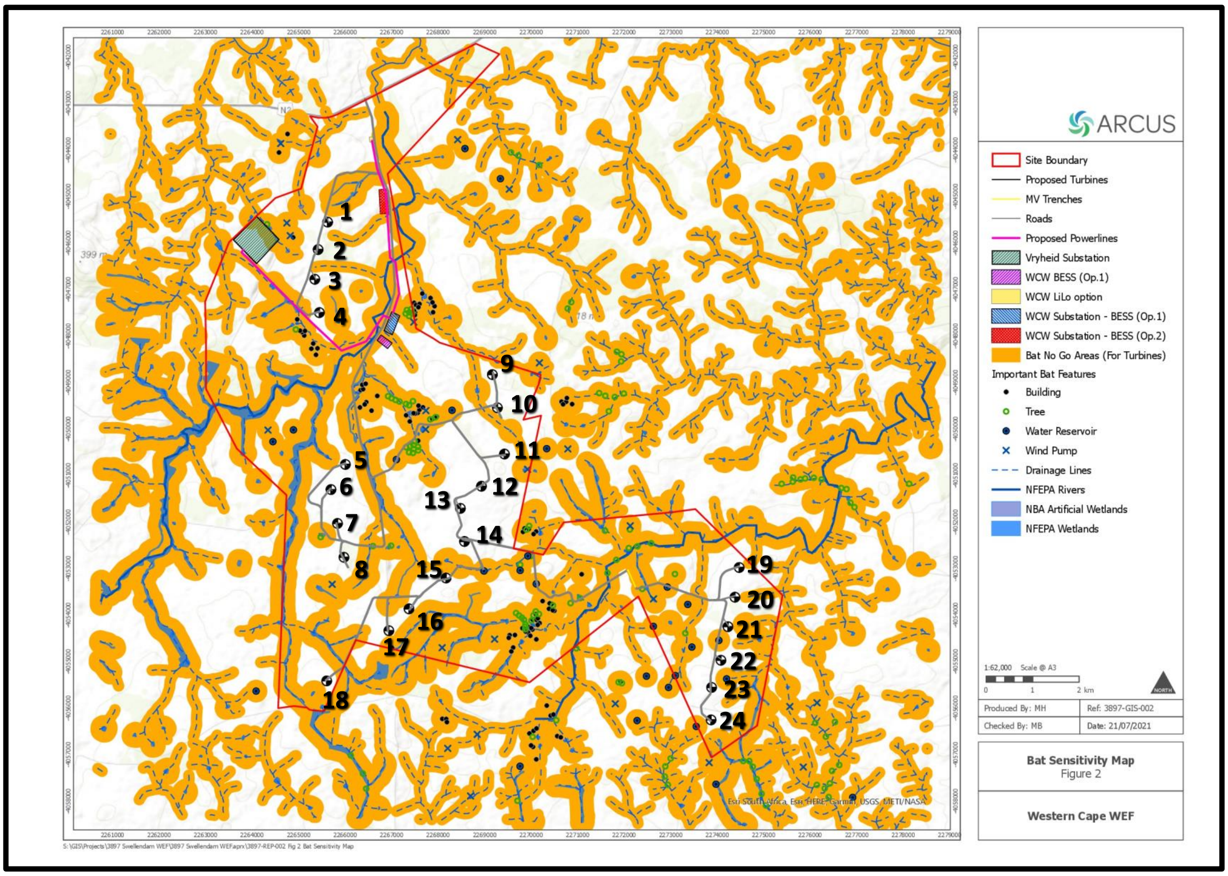


Figure 2.3: Bat Sensitivity Map for the proposed Western Cape WEF, indicating the bat No-Go (Buffer) zones for turbines.

The structural complexity of the habitat is lacking significantly, which corresponds to a lower diversity of bat species and could be the case on the site. The project is, however, in close proximity (approximately 35 km south) to the largest known roost of the migratory Natal long-fingered bat in South Africa, located at the De Hoop nature reserve and agricultural land could host an abundance of insect prey. Otherwise, there is some suitable habitat for bats that can be used for roosting, foraging and commuting in the study area.

Analysis of the acoustic monitoring data suggests that at least seven species of bat are present on Site. Free-tailed bats and Cape serotine bats are likely to face the highest risk of impacts associated with the Western Cape Wind Farm due to their prevalence. Sensitive areas including those used by bats for foraging, roosting and commuting have been mapped in Figure 2.3

A number of potentially negative ecological impacts have been identified, including roost disturbance and/or destruction, habitat modification, Habitat creation in high-risk locations, and collision or barotrauma induced mortality during migration, commuting and/or foraging.

Provided all mitigation measures listed in this report are strictly adhered to, the independent Specialist has indicated that the ***impacts to bats are low to medium****, has not identified any fatal flaws with the project and has indicated that the "the proposed Western Cape Wind Farm may be compatible with bat conservation". A pre-construction monitoring campaign should be conducted to ensure impacts are kept to a minimum.*

Please refer to the Bat Assessment in Appendix D.

2.3.4 Botanical Findings – Nick Helme Botanical Surveys C/O Nick Helme

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from a Botanical perspective.

2.3.4.1 Specialist Findings

The study areas support Eastern Ruens Shale Renosterveld, Cape Lowland Alluvial Vegetation and Ruens Silcrete Renosterveld, all of which are currently gazetted as Critically Endangered habitats on a national basis. High sensitivity vegetation remnants (including drainage lines and wetlands) cover about 10% of the total study area. At least seven different plant Species of Conservation Concern were recorded in the study area, but none in the proposed development footprints. The proposed development layout largely avoids all the identified patches of High sensitivity vegetation, and consequently is likely to have a Very Low negative botanical impact, before and after mitigation, which is the same as the No-Go alternative.

All BESS and substation alternatives are acceptable from a botanical perspective, being in cultivated lands, and with Neutral botanical impacts.

The proposed development is thus supported from a botanical perspective, without any further mitigation.

Please refer to the Botanical Impact Assessment in Appendix D.

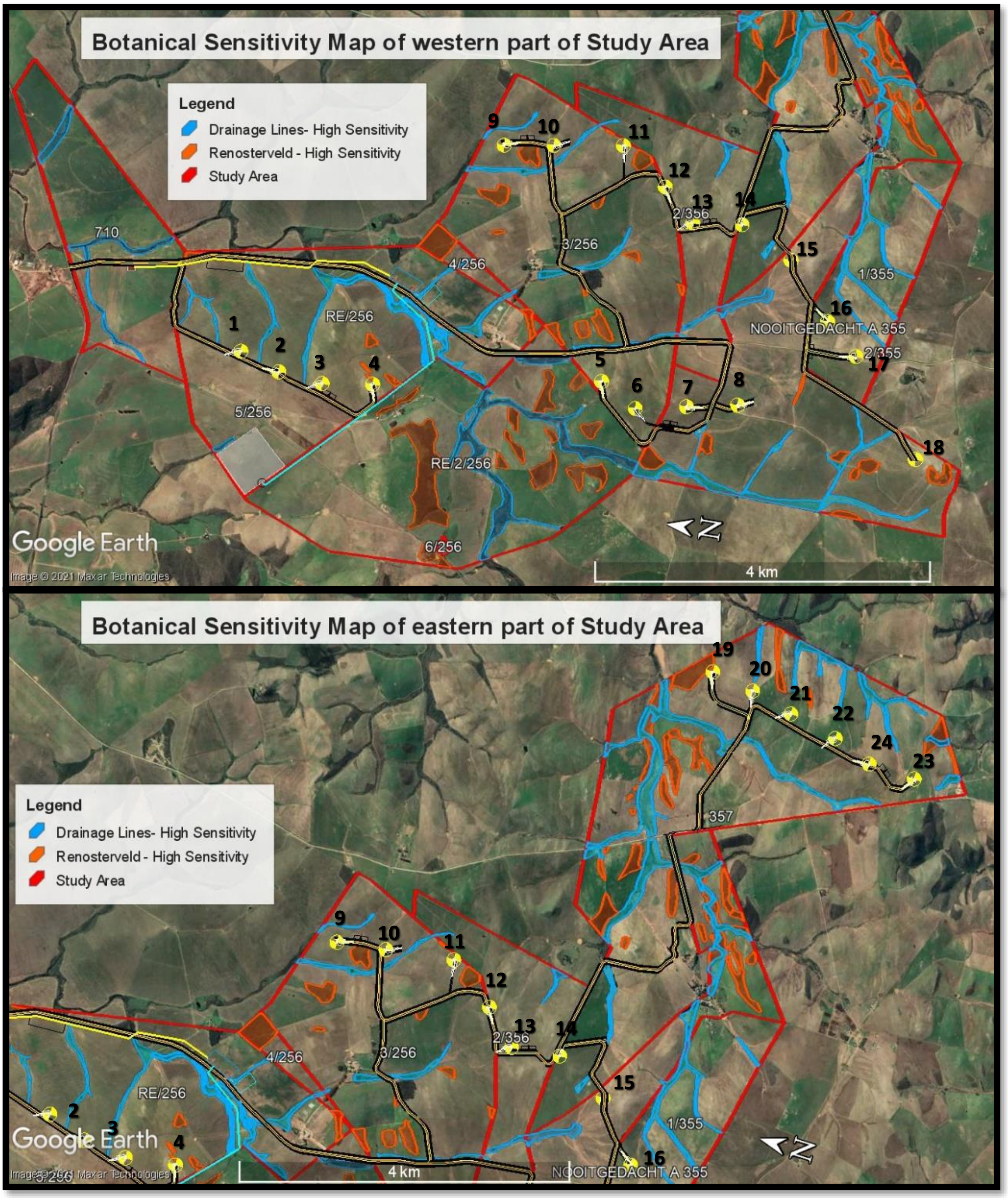


Figure 2.4: Botanical sensitivity maps of the study area, with proposed development layout superimposed. All unshaded areas in the study area are of Low or Medium sensitivity, and High sensitivity drainage lines are shown in blue.

2.3.5 Freshwater Findings – BlueScience C/O Antonia Belcher

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal. and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from a Freshwater perspective, **provided all mitigation measures are adhered to.**

2.3.5.1 Specialist Findings

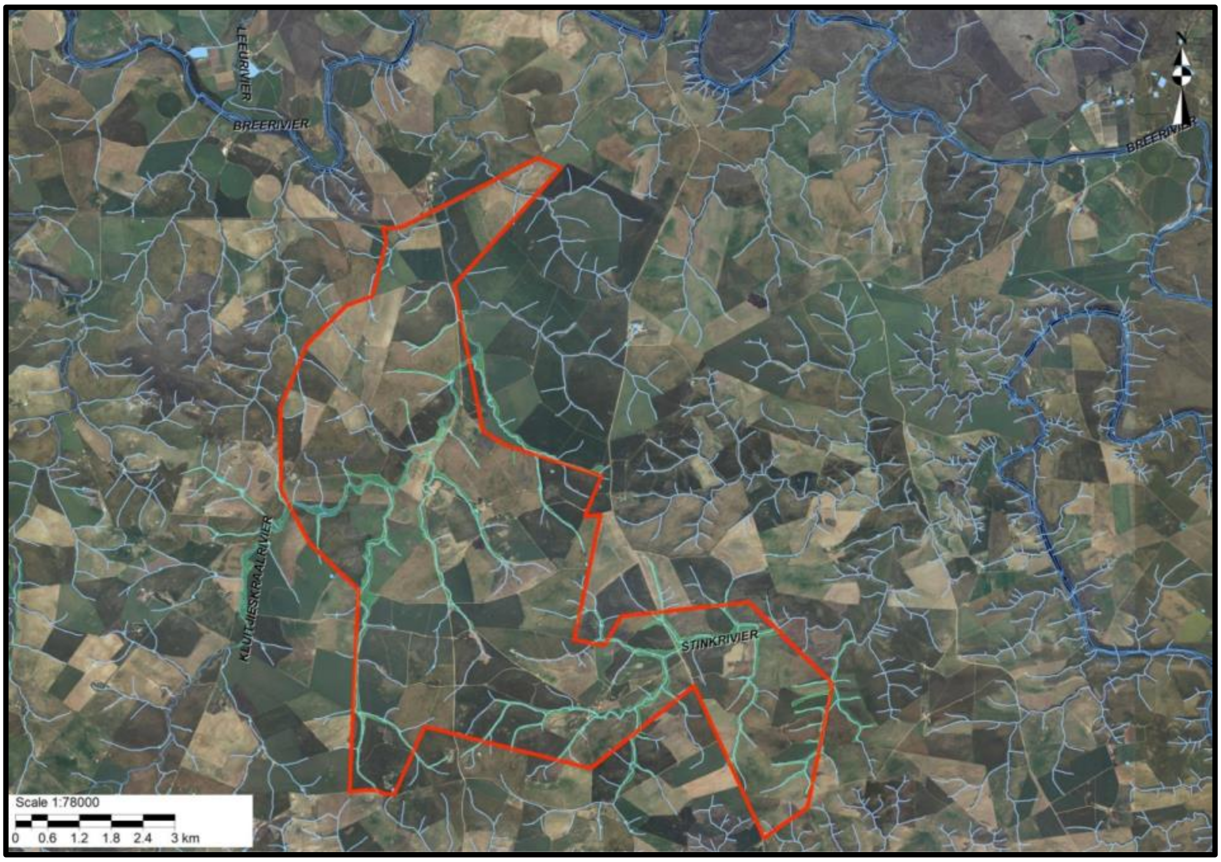


Figure 2.5: This figure shows the location of the main aquatic features within the Western Cape WEF Site.

In terms of the construction of the proposed infrastructure on this site the following potentially negative ecological impacts have been identified:

- Modification or loss of aquatic habitat and water quality impacts;
- Degradation of the ecological condition of aquatic ecosystems;
  - Modification of flow and water quality;
  - Erosion;
  - Alien vegetation invasion in aquatic features;
- Disturbance of aquatic habitats and water quality impacts.

With mitigation, the potential freshwater impacts of the proposed Western Cape WEF for the construction, operation and decommissioning phases are likely to be low. One can also expect that the cumulative impact of the proposed project would not be significant provided mitigation measures are implemented.

Based on the above findings, there is no reason from a freshwater perspective, why the proposed activity (with the implementation of the above-mentioned mitigation measures) should not be authorized.

Please refer to the Agricultural Impact Assessment in Appendix D.

2.3.6 Heritage Findings – CTS Heritage C/O Jenna Lavin

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the proposed WEF and supporting structures are **acceptable and implementable** from a Heritage perspective, provided the mitigation measures are followed.

2.3.6.1 Specialist Findings

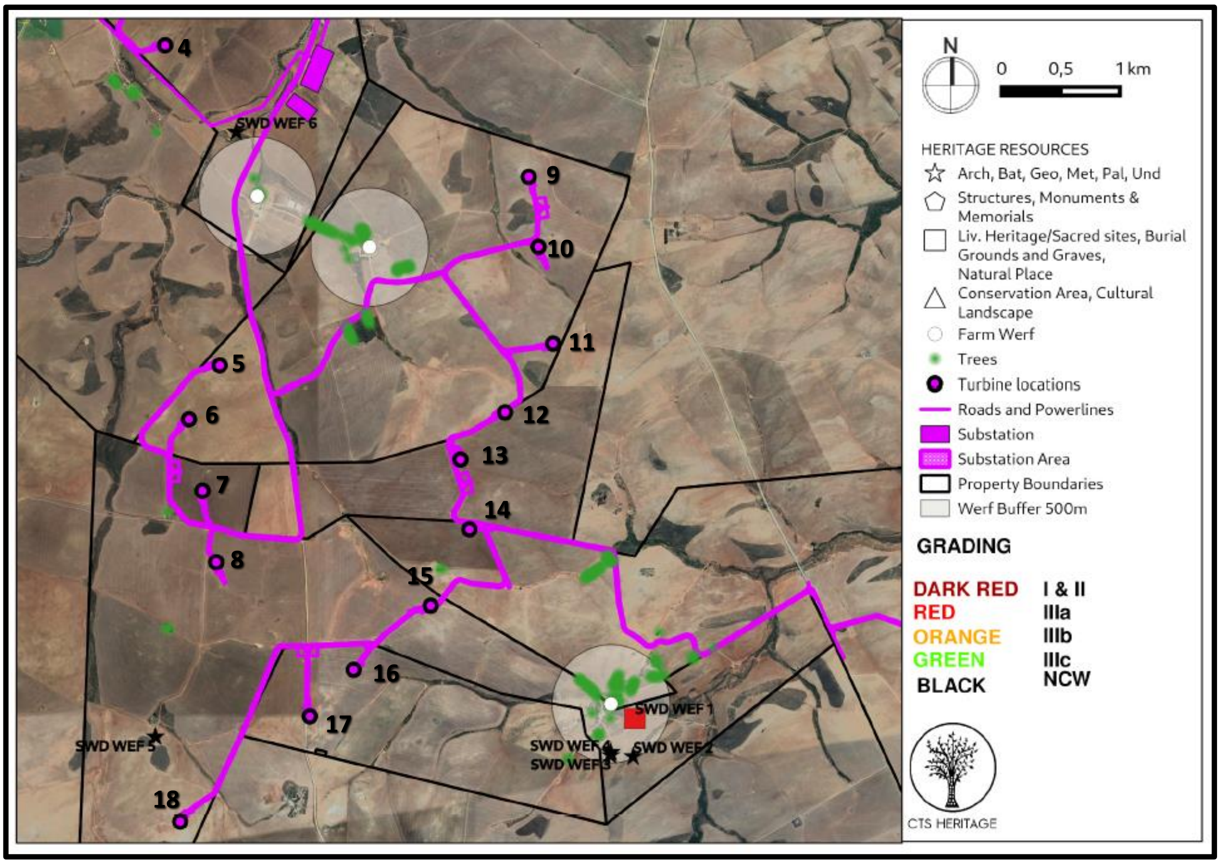


Figure 2.6: Heritage resource map for the proposed Western Cape WEF development, indicating the 500m development buffers around the farm werfs

Based on the desktop assessment completed for this project, it was anticipated that the development would likely negatively impact on archaeology, palaeontology and cultural landscape heritage resources.

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity. Very little archaeology was identified during the field assessment. None of the resources identified on-site will be negatively impacted by the proposed development in the layout provided in July 2021.

In terms of impacts to palaeontological heritage, the field survey conducted as well as several previous palaeontological field assessments in the region indicate that in practice the bedrocks and superficial sediments represented here are of Low Palaeosensitivity.

While the cultural landscape assessment noted that it is unlikely that the historic core of Swellendam would be negatively impacted by the development, significant cultural landscape resources that could be impacted include the N2 Scenic Route, the farm werfs located within the development area. Various mitigation measures are proposed to mitigate the impact anticipated to the cultural landscape, all of which are largely accommodated within the layout for the WEF.

There is no objection to the proposed development on heritage grounds on condition that the final authorised layout is subject to a walkdown by an archaeologist, and all mitigation measures are followed.

Please refer to the Heritage Assessment in Appendix D.

2.3.7 Noise Findings – dBAcoustics C/O Barend J B van der Merwe

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from a Noise perspective.

2.3.7.1 Specialist Findings

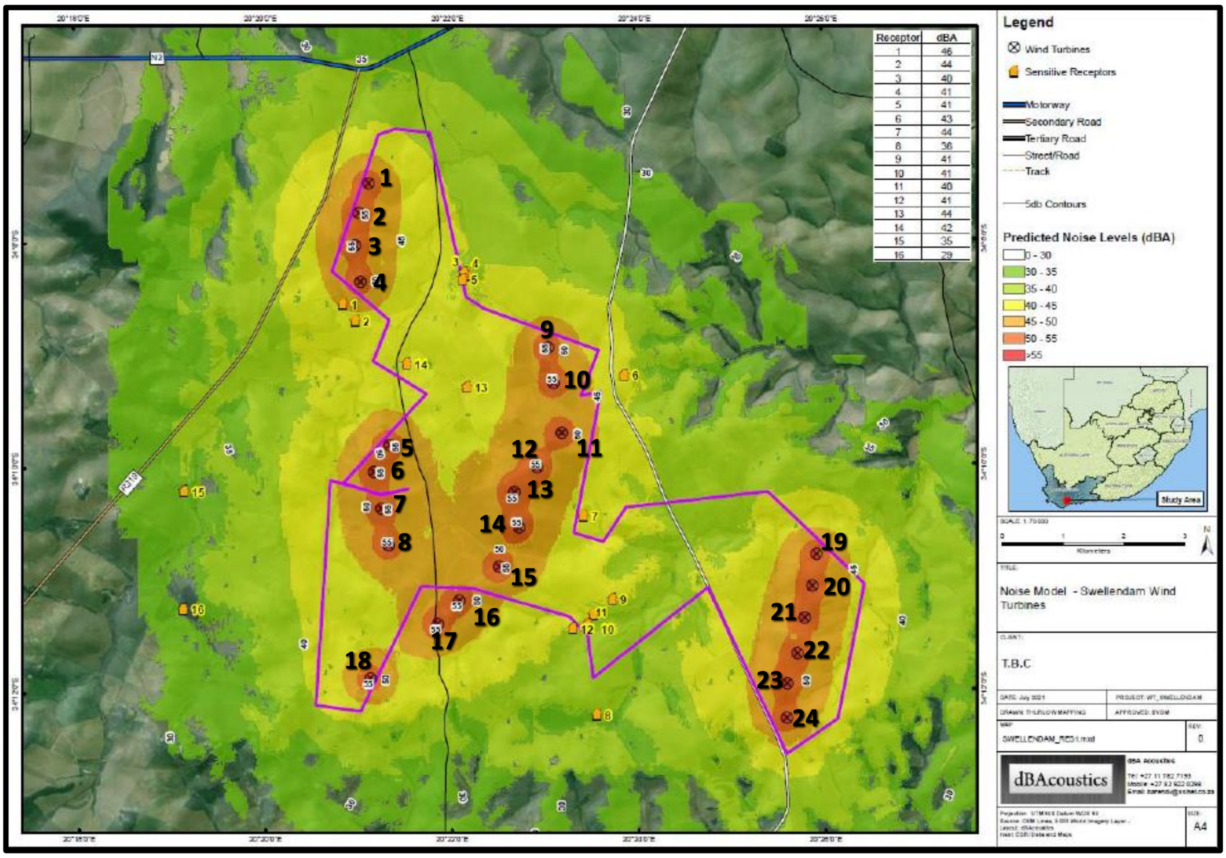


Figure 2.7: Noise Sensitivity Map indicating the Noise contours and noise receptors for the proposed Western Cape WEF.

Due to the nature of the proposed development, there will be an increase in the prevailing ambient noise levels within the vicinity of the wind turbines. All the residential properties are situated outside this buffer zone and the recommended noise level of 45.0dBA at the residential properties for the area outside the buffer zone will be adhered to with the implementation of the noise mitigatory measures.

The threshold value of 7.0dBA (Western Cape Noise Control Regulations, 2013) will not be exceeded during the day and/or night- time periods based on a recommended noise level of 45.0dBA by the DEA. The proposed WEF is supported, and the authorisation thereof can be granted from an environmental noise point of view.

Please refer to the Noise Impact Assessment in Appendix D.

2.3.8 Socio-Economic Findings – Multipurpose Business Solutions C/O Dr Jonathan Bloom

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal. and it is reasonable to suggest that the proposed Western Cape WEF project is **acceptable and implementable** from a Socio-Economic perspective, **provided all mitigation measures are adhered to.**

2.3.8.1 Specialist Findings

There is one operational (Excelsior) and two approved/proposed WEF developments within 30 km of the proposed Western Cape WEF site. The benefits of several renewable energy projects will also be compounded, especially with regard to skills development in a sector that is still in its infancy in South Africa. Any potential negative impacts would be compounded if additional WEF were introduced in the immediate and surrounding areas. However, the addition of several WEF in the Swellendam area could also compound the positive impacts, such as new employment opportunities, economic income and associated business development.

The Western Cape WEF in the Swellendam Municipality is supported on condition that the recommendations/ mitigation measures included in this report are implemented. In addition, the recommended enhancement and mitigation measures contained in other specialist reports and those required to support mitigation of several impacts identified and assessed in the Socio-economic Impact Assessment report should be implemented.

It is also essential that business opportunities for local residents be considered as part of construction procurement processes. Sub-contracting and outsourcing opportunities from businesses that have the necessary skills are essential to enhance socio-economic development and offer greater business sustainability.

In conclusion, the Socio-Economic Specialist did not identified, at this stage, any fatal flaws related to any of the socio-economic impacts assessed in this report.

Please refer to the Agricultural Impact Assessment in Appendix D.

2.3.9 Traffic Findings – Innovative Transport Solutions C/O C. Krogscheepers, P. Arangie & T. Neels

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the proposed WEF and supporting structures are **acceptable and implementable** from a Traffic perspective.

2.3.9.1 Specialist Findings

Existing and Future Background Traffic Conditions

The current demand on the existing road network in the site vicinity is low and the road network and intersections operate at acceptable levels of service. All the intersections and roadways will continue to operate at acceptable levels of service in the future during the worst peak hours of the year without the proposed development.

Construction Phase

It is expected that the construction phase of the proposed development could generate up to 178 vehicular trips during the average weekday of which approximately 6 percent will be heavy truck traffic. Access to the site is proposed via new and existing farm accesses off Provincial roads in the area.

One of the turbine positions is shown right next to DR01251, which is a public road. It is recommended that this turbine be moved 80 metres to the east to clear any possible impact the turbine can have on traffic along DR01251

Operational Phase

The operational phase of this project is not expected to generate significant traffic volumes […] and therefore no additional upgrades are required to accommodate the operational site traffic.

Decommissioning Phase

The expected transport impact on the road network during the decommissioning phase will be similar to the transport impact during the construction phase. The surrounding road network has sufficient capacity to accommodate the expected traffic volumes associated with the decommissioning of the wind farm.

Based on the evaluation as discussed in this report the existing road network has sufficient spare capacity to accommodate the proposed Western Cape Wind Energy Facility without any road upgrades required to the existing road infrastructure. It is recommended that the proposed Western Cape WEF be approved from a transport impact perspective.

Please refer to the Traffic Specialist's Assessment in Appendix D.

2.3.10 Visual Findings – Environmental Planning and Design C/O Jonathan Marshall

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the WEF and supporting structures are **acceptable and implementable** from a Visual perspective.

2.3.10.1 Specialist Findings

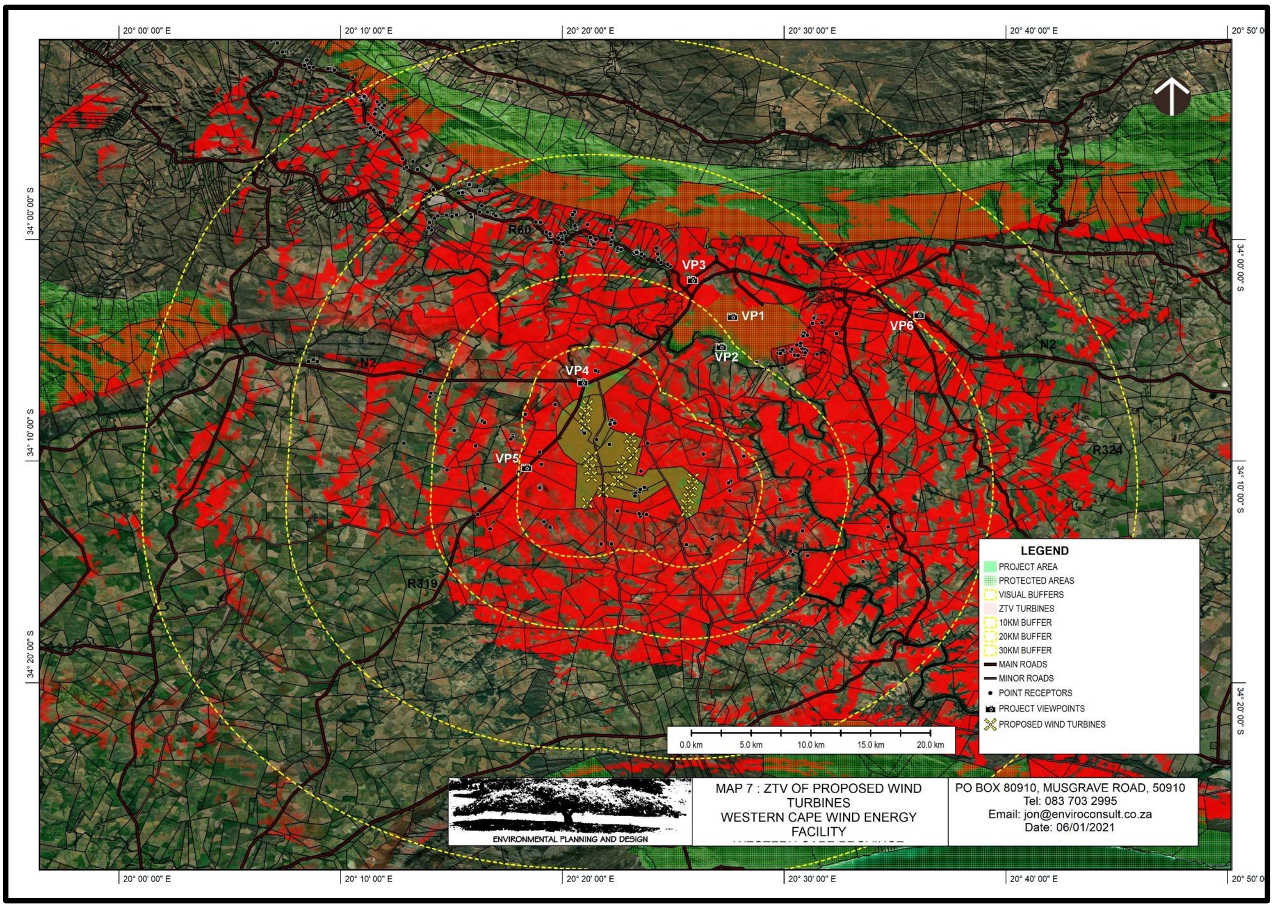


Figure 2.8: Map showing the relative Zones of Theoretical Visibility (ZTV) of the proposed wind turbines for the Western Cape Wind Energy Facility. Viewpoints are also indicated.

The proposed project will be located within a Renewable Energy Development Zone (REDZ). REDZ have been planned by the DEA to ensure that renewable energy projects are focused in the most appropriate areas of the country. It is therefore to be expected that the landscape of these areas will change as projects are developed. This should also mean however that there is less pressure on un-suitable and perhaps more important landscape areas for development.

However, this should not mean that development should just be allowed to occur. The assessment has indicated that perhaps the most important receptors including the Bontebok National Park, the town of Swellendam and the N2 are likely to be subject to relatively low levels of impact.

The potential Visual Impacts can be summarised into three main Impact groups:

- Change in the character of views
- Shadow flicker
- Lighting impact

The area of greatest concern relates to homesteads in the immediate vicinity of the proposed project. The majority of these are located on the affected properties. From the site visit it is understood that none of these include tourism related activities. In addition to industrialisation of views, they could however be subject to shadow flicker.

Cumulative impacts are likely to arise due to the presence of existing WEF projects in the area including the Vryheid WEF and the Excelsior WEF.

As long as mitigation measures are undertaken that will address these issues, there is no reason from a Landscape and Visual Impact why the proposed development should not proceed.

Please refer to the Visual Statement included in Appendix D.

2.4 SUMMARISED IMPACTS ASSOCIATED WITH EACH ALTERNATIVE

This Section summarises the anticipated impacts of each alternative (Preferred Alternative and No-Go alternative) considered, as informed through independent specialist assessment and findings. The detailed comparative impact summary table is described and assessed in Section 12 of this BAR.

2.4.1 POTENTIAL CONSTRUCTION, OPERATIONAL AND DECOMMISSIONING IMPACTS

Construction, Operational, Decommissioning and Cumulative impacts have been assessed by the Professional Team and the EAP and are detailed in Section 12 of this Report.

Agricultural Impacts
Agricultural Impact 1 - Construction in proximity to natural drainage lines (Construction Phase)
Agricultural Impact 2 - Removal of or damage to natural vegetation (Construction Phase)
Agricultural Impact 3 - Degradation of natural resource: soil (Construction Phase)
Agricultural Impact 4 - Disturbance to flow pattern of run-off water (Construction Phase)
Agricultural Impact 5 - Reduction of natural resource: soil (Operational Phase)
Agricultural Impact 6 - Disturbance to flow pattern of run-off water (Operational Phase)
Agricultural Impact 7 - Abstraction of groundwater (Operational Phase)
Agricultural Impact 8 - Aerial crop spraying (Operational Phase)

Avifaunal Impacts
Avifaunal Impact 1 - Displacement of priority avifauna (Construction Phase)
Avifaunal Impact 2 - Mortality of priority avifaunal (Operational Phase)
Avifaunal Impact 3 - Mortality of Cape Vultures (Operational Phase)

Bat Impacts
Bat Impact 1 - Roost disturbance (Construction Phase)
Bat Impact 2 - Roost destruction (Construction Phase)
Bat Impact 3 - Habitat modification (Construction Phase)
Bat Impact 4 - Light pollution (Operational Phase)
Bat Impact 5 - Habitat Creation in High-Risk Locations (Operational Phase)
Bat Impact 6 - Mortality during commuting and/or foraging (Operational Phase)
Bat Impact 7 - Mortality during Migration (Operational Phase)

Botanical Impacts
Botanical Impact 1 – Loss of natural and partly natural vegetation (Construction Phase)
Botanical Impact 2 – Operation Phase Impacts

Freshwater
Freshwater Impact 1 - Construction and operation of WEF
Freshwater Impact 2 - Construction and operation of roads within the WEF
Freshwater Impact 3 - Cumulative Impacts

Heritage Impacts
Heritage Impact 1 - Destruction of the cultural landscape (Construction Phase)
Heritage Impact 2 - Destruction of archaeological heritage (Construction Phase)
Heritage Impact 3 - Destruction of palaeontological heritage (Construction Phase)

Noise Impacts

Noise Impact 1 - Construction Activities
Noise Impact 2 - Operational Noise
Noise Impact 3 - Decommissioning Activities

Social Impacts

Social Impact 1 - Nuisance factors: dust and noise (Construction Phase)
Social Impact 2 - Influx of job seekers (Construction Phase)
Social Impact 3 - Increase in local crime (Construction Phase)
Social Impact 4 - Temporary employment (Construction Phase)
Social Impact 5 - Contribution towards local economic income (Construction Phase)
Social Impact 6 - Human health and well-being (Operational Phase)
Social Impact 7 - Education and training opportunities (Operational Phase)
Social Impact 8 - Provision of renewable energy (Operational Phase)
Social Impact 9 - Surrounding property values (Operational Phase)
Social Impact 10 - Direct spending (Operational Phase)
Social Impact 11 - Creating new employment (Operational Phase)
Social Impact 12 - Revenue for local Municipality (Operational Phase)
Social Impact 13 - Decommissioning Activities

Traffic Impacts

Traffic Impact 1 - Increase in traffic volumes (Construction Phase)
Traffic Impact 2 - Gravel loss and possible damage to the road layer works (Construction Phase)
Traffic Impact 3 - Increase in traffic volumes (Operational Phase)
Traffic Impact 4 - Decommissioning Activities

Visual Impacts

Visual Impact 1 - Change to the character and sense of place of the landscape setting
Visual Impact 2 - Change to the character of the landscape as seen from the R319, the N2 and local roads
Visual Impact 3 - Change to the character of the landscape as seen from the Bontebok National Park
Visual Impact 4 - Change to the character of the landscape as seen from Swellendam
Visual Impact 5 - Change to the character of the landscape as seen from local homesteads
Visual Impact 6 - Shadow flicker on local homesteads
Visual Impact 7 - Lighting impacts

The Construction/Decommissioning impacts are summarised in the table below for ease of reference:

Summary table of overall Significance (for each impact identified):

DESCRIPTION OF IMPACT	**Overall Significance (With Mitigation)**	
	No-Go Alternative	**Preferred Alternative**
Construction Phase		
Agricultural Impact 1 – Construction in proximity to natural drainage lines	Status quo	Low -
Agricultural Impact 2 – Removal of or damage to natural vegetation	Status quo	Low -
Agricultural Impact 3 – Degradation of natural resource: soil	Status quo	Low -
Agricultural Impact 4 – Disturbance to flow pattern of run-off water	Status quo	Low -
Avifaunal Impact 1 – Displacement of priority avifauna	Status quo	Low -
Bat Impact 1 – Roost Disturbance	Status quo	Low -
Bat Impact 2 – Roost Destruction	Status quo	Low -
Bat Impact 3 – Habitat Modification	Status quo	Low -
Bat Impact 4 – Light Pollution	Status quo	Low -
Botanical Impact 1 – Loss of natural and partly natural vegetation	Low to medium -	Low to medium -
Freshwater Impact 1 – Construction and operation of WEF	Low -	Low -
Freshwater Impact 2 – Construction and operation of roads within the WEF	Low -	Low -

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	**Preferred Alternative**
Heritage Impact 1 – Destruction of the cultural landscape	Status quo	Low -
Heritage Impact 2 – Destruction of archaeological heritage	Status quo	Low -
Heritage Impact 3 – Destruction of palaeontological heritage	Status quo	Low -
Noise Impact 1 - Construction Activities (Construction Phase)	Low -	Low -
Social Impact 1 - Nuisance factors - dust and noise	Status quo	Low -
Social Impact 2 - Influx of job seekers	Status quo	Low -
Social Impact 3 - Increase in local crime	Status quo	Low -
Social Impact 4 - Temporary employment	Status quo	Low +
Social Impact 5 - Contribution towards local economic income	Status quo	Low +
Traffic Impact 1 – Construction Phase	Low -	Low -
Visual Impacts – Construction Phase	Status quo	Medium-
Operational Phase		
Agricultural Impact 1 – Reduction of natural resource: soil	Status quo	Low -
Agricultural Impact 2 – Disturbance to flow pattern of run-off water	Status quo	Low -
Agricultural Impact 3 – Abstraction of groundwater	Status quo	Low -

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	Preferred Alternative
Agricultural Impact 4 – Aerial crop spraying	Status quo	Low -
Avifaunal Impact 1 – Mortality of priority avifauna and Cape Vultures (Turbine Collisions)	Status quo	Low -
Avifaunal Impact 2 – Mortality of priority avifauna and Cape Vultures (Substation electrocution)	Status quo	Low -
Avifaunal Impact 3 – Mortality of priority avifauna and Cape Vultures (132kV grid electrocution)	Status quo	Low -
Avifaunal Impact 4 – Mortality of priority avifauna and Cape Vultures (132kV grid collisions)	Status quo	Low -
Bat Impact 1 – Habitat Creation in High-Risk Locations	Status quo	Low -
Bat Impact 2 – Mortality during commuting and/or foraging	Status quo	Low -
Bat Impact 3 – Mortality during migration	Status quo	Medium -
Bat Impact 4 – Light Pollution	Status quo	Low -
Noise Impact 2 - Operational Noise (Operational Phase)	Low -	Low -
Social Impact 1 - Human health and well-being	Status quo	Low -
Social Impact 2 - Education and training opportunities	Status quo	Low +
Social Impact 3 - Provision of renewable energy	Status quo	Low +

DESCRIPTION OF IMPACT	**Overall Significance (With Mitigation)**	
	No-Go Alternative	**Preferred Alternative**
Social Impact 4 - Surrounding property values	Status quo	Low +
Social Impact 5 - Direct spending	Status quo	Low +
Social Impact 6 - Creating new employment	Status quo	Low +
Social Impact 7 - Revenue for local Municipality	Status quo	Low +
Traffic Impact 1 – Operational Phase	Low -	Low -
Visual Impacts – Operational Phase	Status quo	Medium-
Cumulative Impacts		
Avifaunal Impact 1 – Mortality of priority avifauna and Cape Vultures	Status quo	Medium -
Bat Impact 1 – Cumulative Impacts	Low -	Low -
Botanical Impact 1 – Cumulative Impacts	Low -	Low -
Freshwater Impact 1 – Cumulative Impacts	Low -	Low -

* Cumulative Overall Findings as inferred from the Specialist Report. The highest impact level identified by the specialist is used.

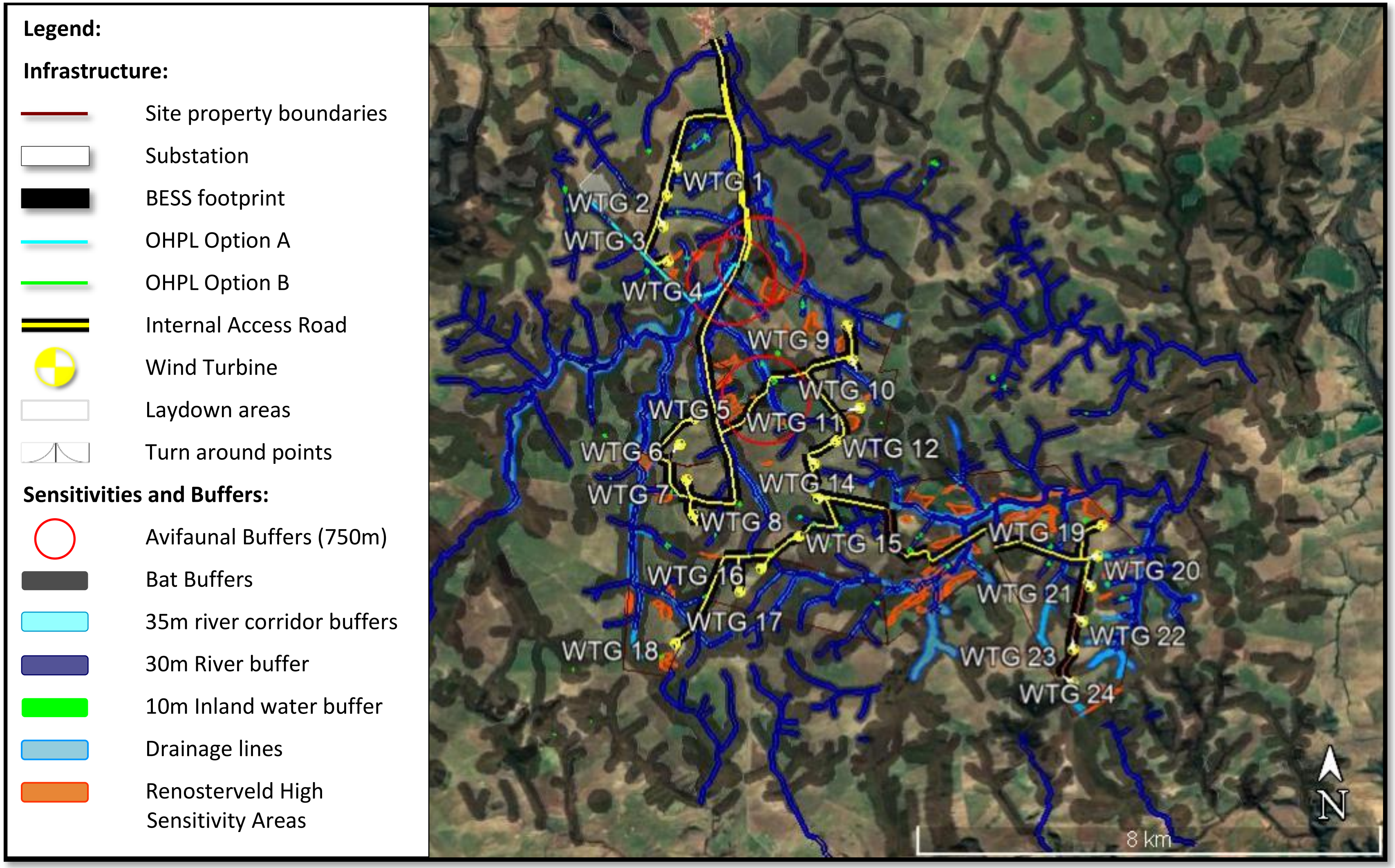


Figure 2.9: Map of the full WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 2.10: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 2.11: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

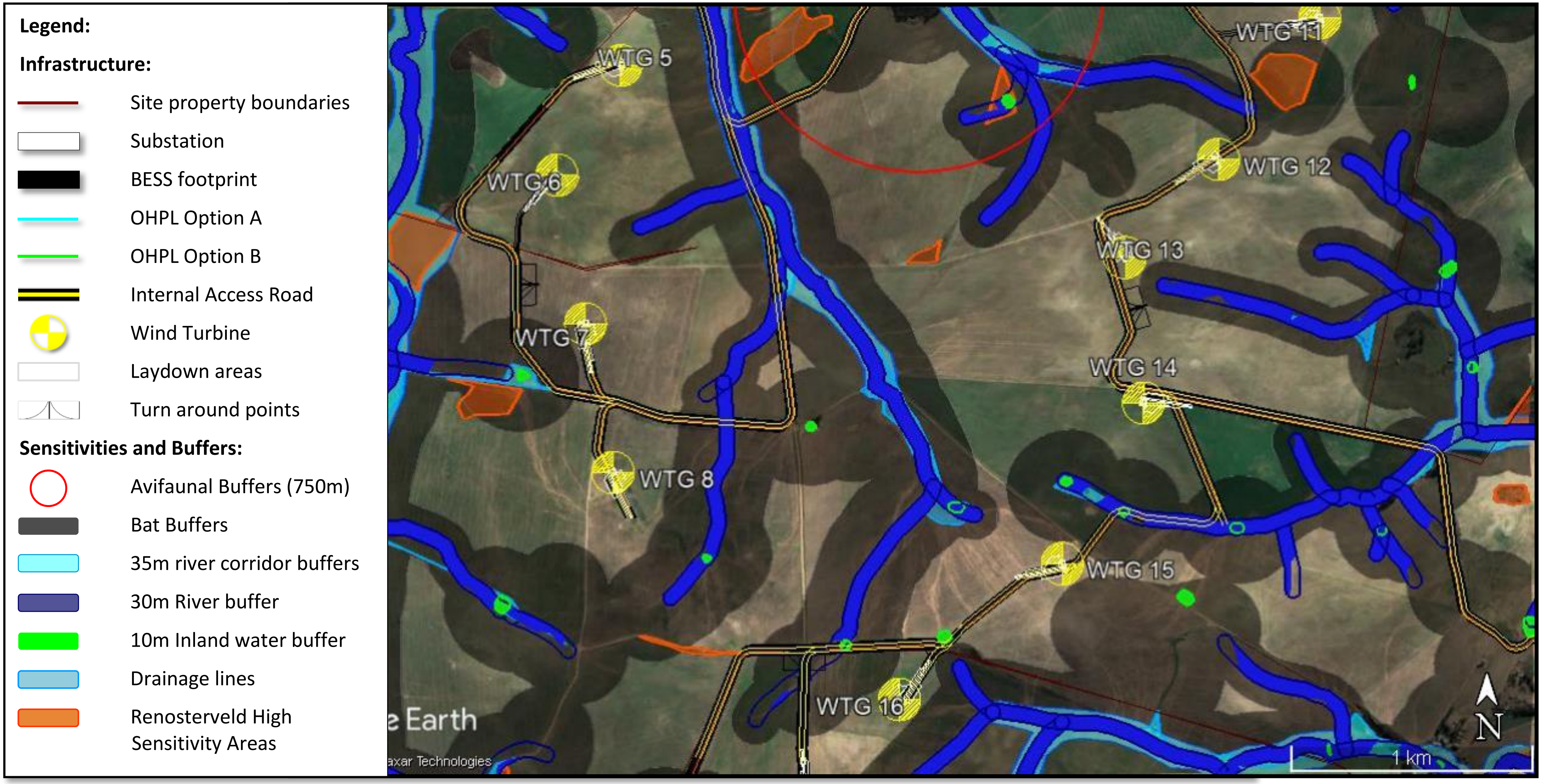


Figure 2.12: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

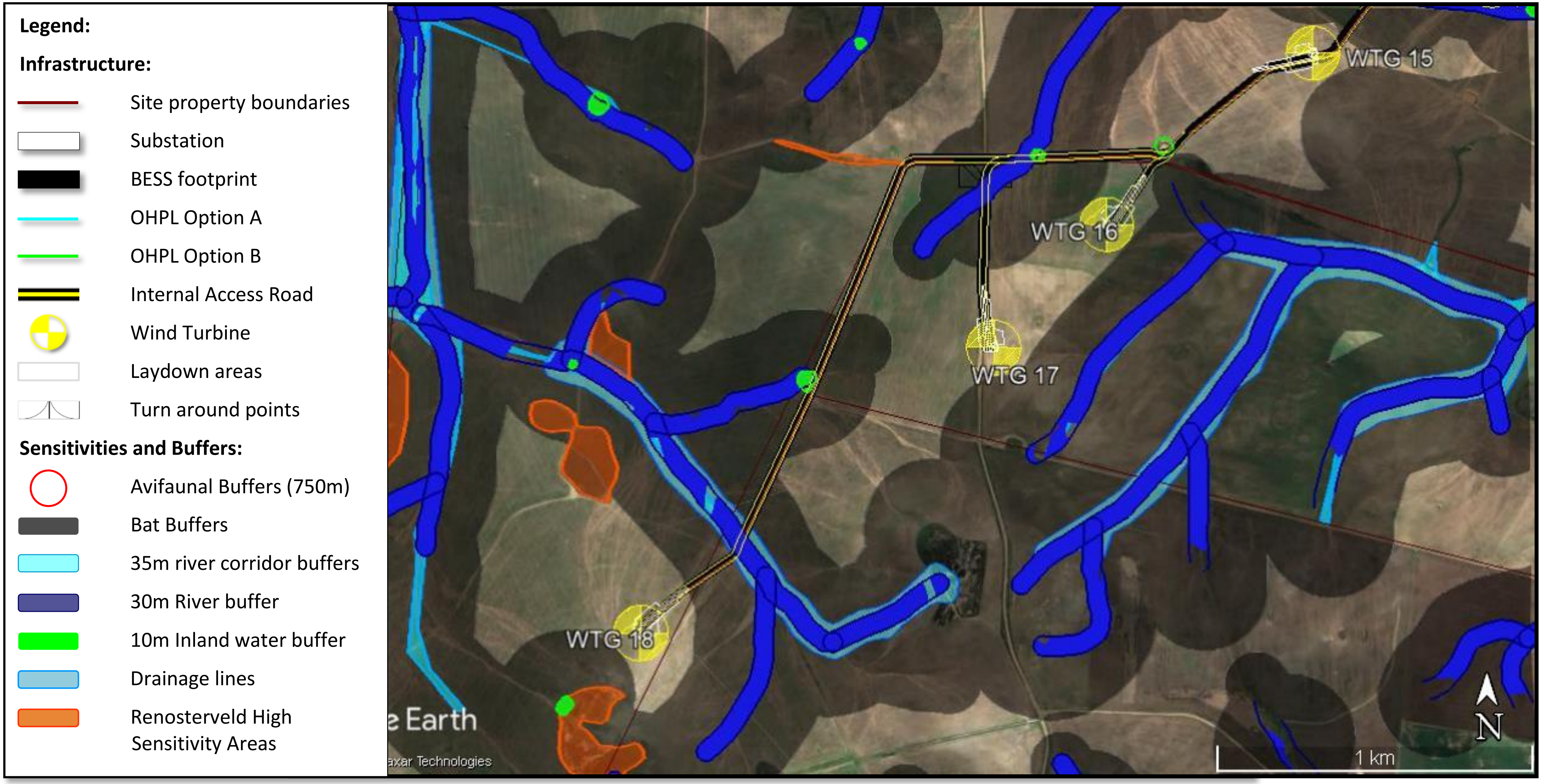


Figure 2.13: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 2.14: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

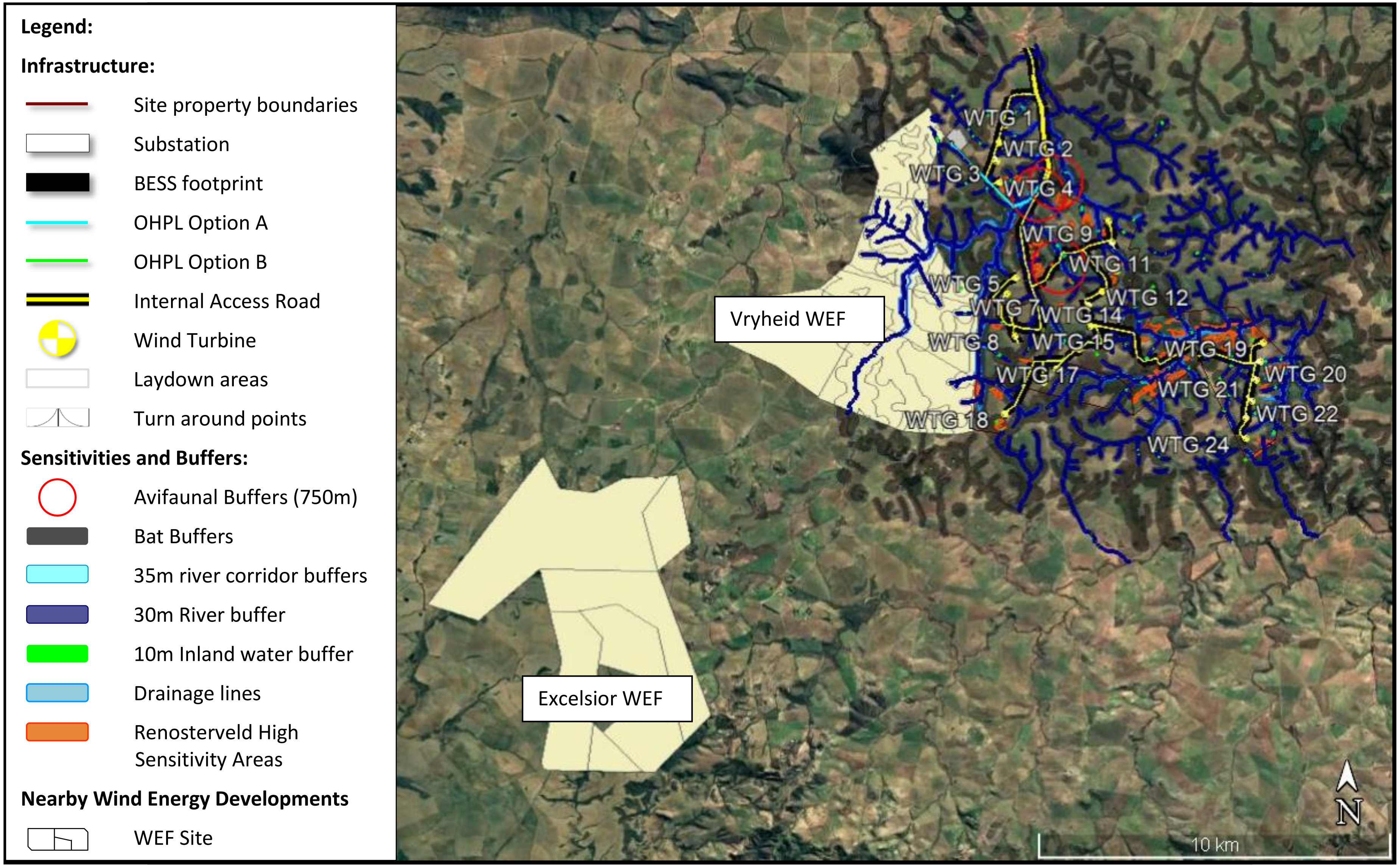


Figure 2.15: Map of the WC WEF Site showing the proposed Layout, the environmental sensitivities, buffer zones and the surrounding Wind Energy Facilities being developed that were used to assess the cumulative environmental impacts

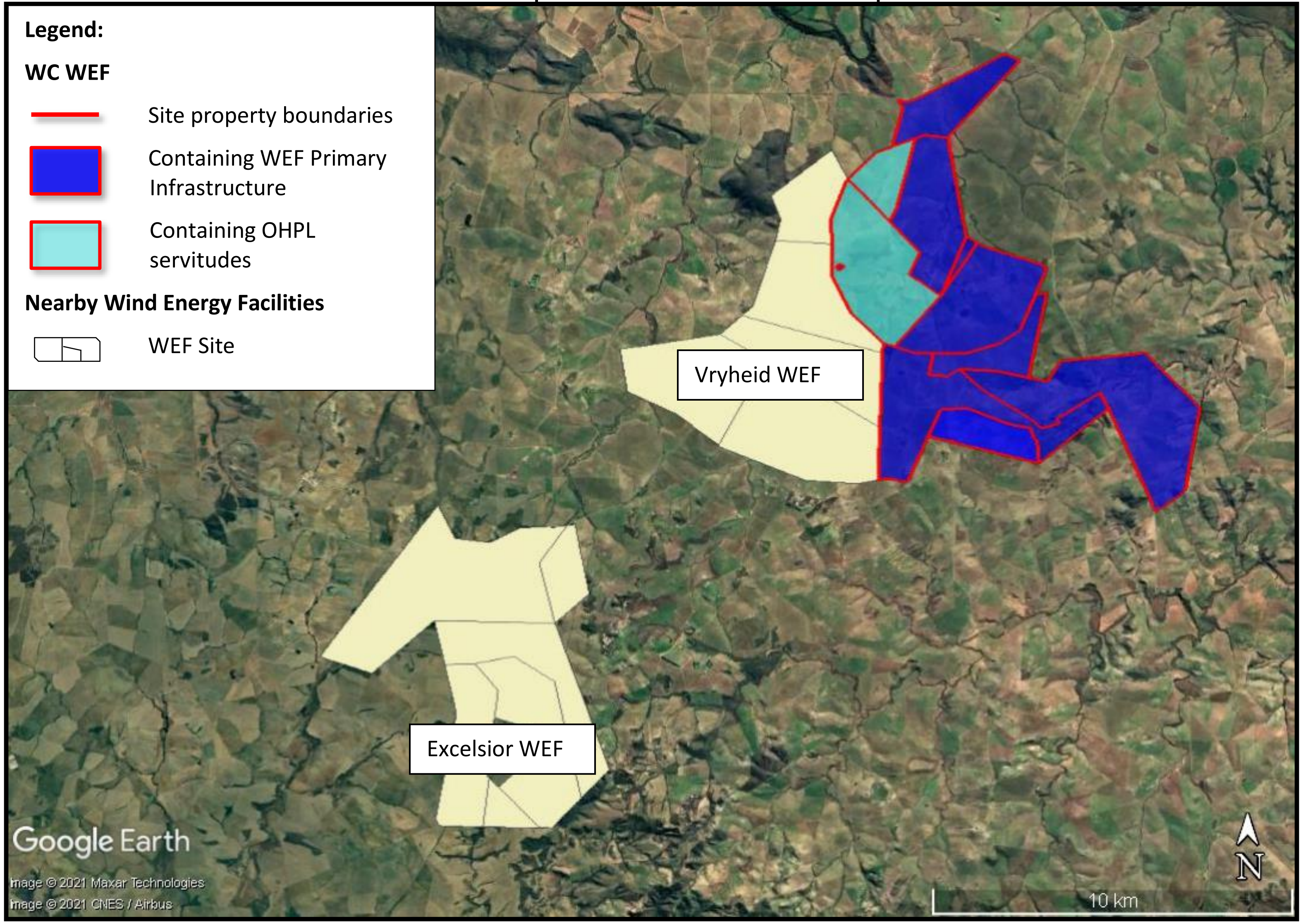


Figure 2.16: Map of the WC WEF Site relative to the surrounding Wind Energy Facilities being developed that were used to assess the cumulative environmental impacts

2.5 OVERALL FINDINGS FOR THIS BASIC ASSESSMENT REPORT

The site is located within one of the gazetted Renewable Energy Development Zones (REDZ). These REDZ and Power Corridors are geographical areas where wind and solar Photovoltaic technologies can be incentivized and where 'deep' grid expansion can be directed and where regulatory processes will be streamlined. The REDZs act as energy generation hubs and provide anchor points for grid expansion thereby allowing for strategic and proactive expansion of grid into these areas. This will ensure that the grid expansion does not hamper the progress of the renewable energy power purchase agreement process.

Based on the information presented in this Report, as informed by the statutory requirements, independent expert studies, public consultation, commenting authorities and the competent authority, the findings indicate that the Project, in the form of the preferred alternative, (read strictly in conjunction with the mitigation measures stipulated in Section 18.2 of this Basic Assessment Report as well as the attached EMPr, which must form part of the conditions of the EA) **will not result in unacceptable negative impacts**.

During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed.

The Preferred Alternative for this Project is described as follows:

- Up to 24 WTGs with a total output of 140MW,
- Generation capacity of up to 5.6MW each,
- Each WTG will consist of a transformer, steel tower, hub, nacelle (gear box), and three rotor blades,
- Hub height of up to 120m,
- Total height up to a max of 200m,
- Battery Energy Storage Systems (BESS) associated with the WEF,
- 24 concrete foundations to support the turbine towers (15m x 15m x 2.5m in depth),
- 24 temporary turbine laydown areas of 80m x 30m (57 600m^2),
- A 132kV substation with high voltage (HV) yard footprint of approximately 100m x 100m (1000m2),
- Underground cabling between the WEF's components following existing roads,
- Two 132kV Overhead Powerline (OHPL) options connecting the WEF to an existing Eskom network grid,
- Internal access roads (approx.10m wide and approx. 40km long) linking the wind turbines and the infrastructure on the site, and
- Operations and maintenance building including a storage facility with a footprint of 40m x 20m (800m^2) for maintenance and storage purposes.

In conclusion and based on:

i. the specialist study findings undertaken by the professional team appointed to this this Project and represented in Section 8 of this BAR;
ii. the assessment undertaken by the EAP in conjunction with the Specialist Findings and represented in Section 8 and 12 of the BAR; and
iii. the motivation of Alternatives in Section 9.

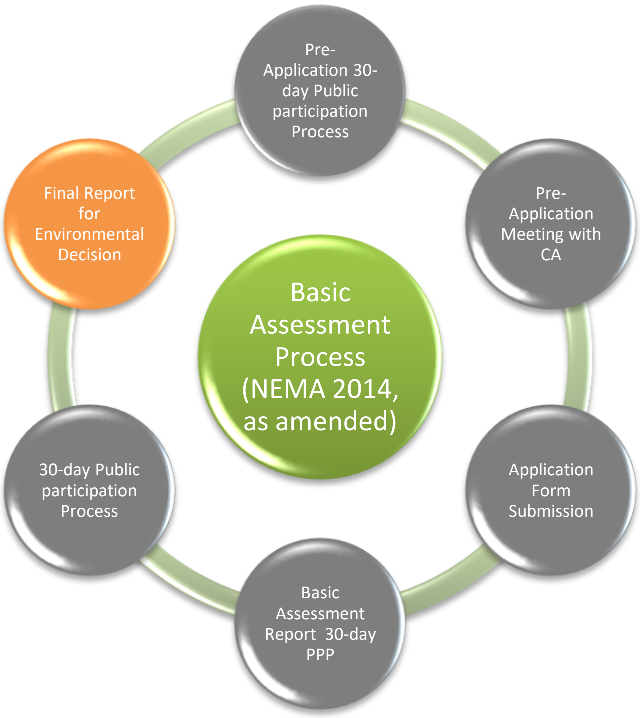
It is reasonable to suggest **that there is no reason why the Competent Authority should not authorise the preferred alternative.**

Based on the above, and the findings of this environmental assessment process, there is no reason to suggest that the preferred alternative cannot be authorised by the Competent Authority.

3 GENERAL PROJECT INFORMATION

3.1 OVERVIEW OF THE BASIC ASSESSMENT PROCESS

The **Basic Assessment process** can be broadly broken down into the key phases presented in the image below. The process proposed is in keeping with the requirements stipulated in the NEMA EIA Regulations (2014, as amended) (GN No. R. 326 refers):



The phases highlighted in grey above illustrate phases already completed. The phase highlighted in orange is currently underway and the phases highlighted in green are pending. The application requirements as set out in Notice Nos R. 326, R. 327, R. 325 and R. 324, promulgated in terms of Section 5 of the NEMA and the requirements of the Department of Environmental Affairs (DEA) have been followed in the preparation of this BAR.

The Final BAR was available for 30-day Public Participation Process (PPP). PPP commenced on **04 October 2021** and concluded on **02 November 2021 (03 November 2021 as 01 November 2021 was announced as a public holiday for municipal elections)**. Once this commenting period has concluded, the Final Basic Assessment will be submitted for decision.

3.2 CONTENT OF THE BASIC ASSESSMENT REPORT

This Final BAR for public consultation contains all information which is necessary for an appropriate understanding of the project, describing all considered alternatives, the scope of the assessment, and the consultation process to be undertaken throughout the BAR Environmental Permitting Process. The summarised content of this BAR, as prescribed by NEMA EIA Regulations (2014, as amended) is presented in Table 3.2 below.

Appendix 1 Regulation 3 of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended) stipulates that a BAR must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include the following:

Table 3.2: Requirements of the NEMA EIA Regulations (2014, as amended).

Regulation		Scope of Assessment and Content of Basic Assessment Report	Relevant Sections
A1 R3 (a)		**Details of:**	
	(i)	*The EAP who prepared the report; and*	Section 4.2
	(ii)	*The expertise of the EAP, including a curriculum vitae*	Section 4.2
A1 R3 (b)		***The location of the activity, including:***	
	(i)	*The 21 digit Surveyor General code of each cadastral land parcel;*	Section 4.3
	(ii)	*Where available, the physical address and farm name; and*	Section 4.3
	(iii)	*Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.*	Section 4.3
A1 R3 (c)		***A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-***	
	(i)	*a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;*	Section 4.3
	(ii)	*on land where the property has not been defined, the coordinates within which the activity is to be undertaken;*	Section 4.3
A1 R3 (d)		***A description of the scope of the proposed activity, including:***	
	(i)	*All listed and specified activities triggered and being applied for; and*	Section 5.3
	(ii)	*A description of the associated structures and infrastructure related to the development*	Section 5.2
A1 R3 (e)		***A description of the policy and legislative context within which the development is proposed including:***	
	(i)	*An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and*	Section 6
	(ii)	*How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments*	Section 6
A1 R3 (f)		***A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location***	Section 7
A1 R3 (g)		***A motivation for the preferred development footprint within the approved site***	Section 9.2
A1 R3 (h)		***A full description of the process followed to reach the proposed development footprint within the approved site, including:***	
	(i)	*Details of the alternatives considered;*	Section 9.1

	(ii)	*Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;*	Section 14
	(iii)	*A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;*	N/A
	(iv)	*The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;*	Section 8
	(v)	*The impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-*	Section 12
		(aa) Can be reversed	Section 12
		(bb) May cause irreplaceable loss of resources; and	Section 12
		(cc) Can be avoided, managed or mitigated	Section 12
	(vi)	*The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks with the alternatives;*	Section 11
	(vii)	*Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;*	Section 12
	(viii)	*The possible mitigation measures that could be applied and level of residual risk;*	Section 12
	(ix)	*The outcome of the site selection matrix;*	Section 10
	(x)	*if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and*	Section 9
	(xi)	*A concluding statement indicating the preferred alternative development location within the approved site;*	Section 9.2
A1 R3 (i)		***A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-***	
	(i)	*A description of all environmental issues and risks that were identified during the environmental impact assessment process; and*	Section 12
	(ii)	*An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;*	Section 12
A1 R3 (j)		***An assessment of each identified potentially significant impact and risk, including-***	
	(i)	*Cumulative impacts;*	Section 12
	(ii)	*The nature, significance and consequences of the impact and risk;*	Section 12
	(iii)	*The extent and duration of the impact and risk;*	Section 12
	(iv)	*The probability of the impact and risk occurring;*	Section 12
	(v)	*The degree to which the impact and risk can be reversed;*	Section 12
	(vi)	*The degree to which the impact and risk may cause irreplaceable loss of resources; and*	Section 12
	(vii)	*The degree to which the impact and risk can be mitigated;*	Section 12
A1 R3 (k)		***Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;***	Section 8
A1 R3 (l)		***An environmental impact statement which contains:***	
	(i)	*A summary of the key findings of the environmental impact assessment:*	Section 2
	(ii)	*Map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and*	Section 2

	(iii)	*A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;*	Section 2
A1 R3 (m)		***Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;***	Section 8
A1 R3 (n)		***Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation***	Not Applicable accommodated in the EMPr
A1 R3 (o)		***A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;***	Section 17
A1 R3 (p)		***A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;***	Section 18
A1 R3 (q)		***Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;***	Section 18 – Not Applicable
A1 R3 (r)		***An undertaking under oath or affirmation by the EAP in relation to:***	
	(i)	*The correctness of the information provided in the reports;*	Section 19
	(ii)	*The inclusion of comments and inputs from stakeholders and I&APs;*	Section 19
	(iii)	*The inclusion of inputs and recommendations from the specialist reports where*	Section 19
		relevant; and	
	(iv)	*Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;*	Section 19
A1 R3 (s)		***Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts***	Not Applicable
A1 R3 (t)		***Any specific information that may be required by the Competent Authority***	Section 16
A1 R3 (u)		***Any other matters required in terms of Section 24(4)(a) and (b) of the Act***	This BAR has been written in accordance with Section 24(4) (a) and (b) of the Act.

3.3 OBJECTIVES OF THE BASIC ASSESSMENT PROCESS

In accordance with the **Appendix 1 Regulation 2 of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)** the objective of the BAR is to, through a consultative process-

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives;
(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine-
   i. the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
   ii. the degree to which these impacts-
      (aa) can be reversed;
      (bb) may cause irreplaceable loss of resources; and
      (cc) can be avoided, managed or mitigated; and
(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to-
   i. identify and motivate a preferred site, activity and technology alternative;
   ii. identify suitable measures to avoid, manage or mitigate identified impacts; and
   iii. identify residual risks that need to be managed and monitored

4 PROJECT DETAILS

4.1 ENTITY RESPONSIBLE FOR DEVELOPMENT OF THE PROJECT

Table 4.1: This table depicts the Project Administrative Details

PROJECT ADMINISTRATION DETAILS	
DEVELOPMENT ENTITY	
Applicant Name	Western Cape Wind Farm (Pty) Ltd
Responsible Person	Mr Jason Cope
Address	77 Leeuwendal 3 Derwent St Gardens Cape Town 8001
Contact Details	+27 21 020 1044 (T) Email: jcope@veldren.co.za

4.2 EAP DETAILS, EXPERTISE AND INDEPENDENCE

In accordance with ***Appendix 1 Regulation 3(a) of GN No. R.326 of the NEMA EIA Regulations (2014, as amended)****:*

Details of-

i. The EAP that prepared the report, and
ii. The expertise of the EAP, including curriculum vitae

Terramanzi Group (Pty) Ltd ("TMG"), is the consulting firm appointed to undertake this Application for Environmental Authorisation (EA) on behalf of the Applicant.

Johann Kilian is the independent EAP responsible for this report. Johann is an environmental consultant with more than 7 years of experience in the environmental management industry. He is registered with SACNASP as a Professional Natural Scientist in the field of Earth Science. Johann holds a BSc in Earth Science as well as a BSc (Hons) in Geology from the University of Stellenbosch, and is a senior member of the Environmental Services Team at Terramanzi Group (Pty) Ltd.

Johann Kilian was assisted and supported on this project and the associated report writing by Evan Milborrow, who holds a who holds a BSc in Chemistry and Biochemistry, a BSc (Hons) and MSc in Molecular and Cell Biology from the University of Cape Town, and is a junior member of the Environmental Services Team at Terramanzi Group (Pty) Ltd.

This report was also reviewed by Fabio Venturi whose career spans over 19 years in the industry, across both the government and private sectors of the green economy. Fabio's entrepreneurial drive to innovate and influence has resulted in multiple industry firsts and awards. Fabio is an Accredited Professional with the GBCSA, a Certified Environmental Scientist, served on the South Africa Environmental Industry Body, that being the Western Cape Committee Branch of the South African Affiliate of the International Association for Impact Assessment (IAIAsa), and sat on the National Executive Committee (NEC) of IAIAsa, is a founding member of the Environmental Assessment Practitioner's Association of South Africa (EAPASA), and is a Certified Carbon Footprint Analyst and Energy Efficiency Auditor.

TMG hereby declares that they have no conflicts of interest related to the work of this report. Specifically, TMG declares that they have no personal financial interests in the property and/or activity being assessed in this report, and that they have no personal or financial connections to the relevant property owners, developers, planners, financiers or consultants of the property or activity, other than fair remuneration for professional services rendered for this report to the Competent Authority. TMG declares that the opinions expressed in this report are independent and a true reflection of their professional expertise.

TMG is a **Level 4 Broad Based Black Economic Empowerment Company** and is **professionally accredited** with a number of relevant industry bodies, in line with the Preferential Procurement Policy Framework Act No. 5 of 2000 (PPPFA).

Please refer to Appendix I for the EAP's Curriculum Vitae

4.3 PROJECT LOCATION

*In accordance with **Appendix 1 Regulation 3(b) of GN No. R. 326 of the NEMA EIA Regulations (2017, as amended)**:*

***3(b):** The location of the activity, including:*

i. The 21-digit Surveyor General Code of each cadastral land parcel;
ii. Where available the physical address and farm name; and
iii. Where the required information in terms (i) and (ii) is not available, the coordinates of the boundary of the property or properties.

The proposed Western Cape WEF located south-west of Swellendam within the Swellendam Local Municipality and the larger Overberg District Municipality. The cadastral units making up the Western Cape WEF are given in Table 4.2 below.

Table 4.2: Details of the land parcel(s) within the Western Cape WEF, where the proposed structures and Basic Assessment will be located.

Wind Turbines and Wind Farm infrastructure:	Overhead Powerline servitudes and Eskom Substations:
KLUITJIESKRAAL RE/256 KLUITJIESKRAAL 3/256 KLEIN CROEDINIE 2/356 NOOITGEDACHT A RE/355 NOOITGEDACHT A 1/355 BURGERTS DAL 357 KLUITJIESKRAAL 4/256	KLUITJIESKRAAL 710 KLUITJIESKRAAL 5/256 KLUITJIESKRAAL RE/2/256

Table 4.3: Details of the land parcel(s) within the Western Cape WEF and SG Codes.

Land Parcel	SG Code
KLUITJIESKRAAL RE/256	C07300000000025600000
KLUITJIESKRAAL 3/256	C07300000000025600003
KLEIN CROEDINIE 2/356	C07300000000035600002
NOOITGEDACHT A RE/355	C07300000000035500000
NOOITGEDACHT A 1/355	C07300000000035500001
BURGERTS DAL 357	C07300000000035700000
KLUITJIESKRAAL 710	C07300000000071000000
KLUITJIESKRAAL 5/256	C07300000000025600005
KLUITJIESKRAAL RE/2/256	C07300000000025600002
KLUITJIESKRAAL 4/256	C07300000000025600004

All Western Cape WEF farm portions, are illustrated in Figure 4.3.

4.4 SITE LOCATION OF THE PROJECT

*In accordance with **Appendix 1 Regulation 3 (c) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

***3(c):** A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructures at an appropriate scale, or if it is-*

- *i. A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken*
- *ii. On land where the property has not been defined, the coordinates within which the activity is to be undertaken*

The project is located in the Swellendam Local Municipality, within the Overberg District Municipality of the Western Cape Province (Refer to Figures 4.1 and 4.2). The Project spans a number of land parcels (hereinafter referred to as the "Site") located approximately 15 km southwest of the town of Swellendam and lies within both the Swellendam Municipality and the Overberg Renewable Energy Development Zone (REDZ), Western Cape Province, South Africa (See Figure 4.3, Figure 4.4 and Figure 4.5).

Access to the site exists via a secondary road which traverses the site from north to south and which connects the N2 national road which runs along the northern boundary of the Site, northeast towards Swellendam. Several less significant local roads lead from this secondary road to various parts of the site. The R319 national road intersects the western edge of the site and joins up with the N2 at the northwest Site boundary.

The site is currently zoned for Agriculture (See Figure 4.6).

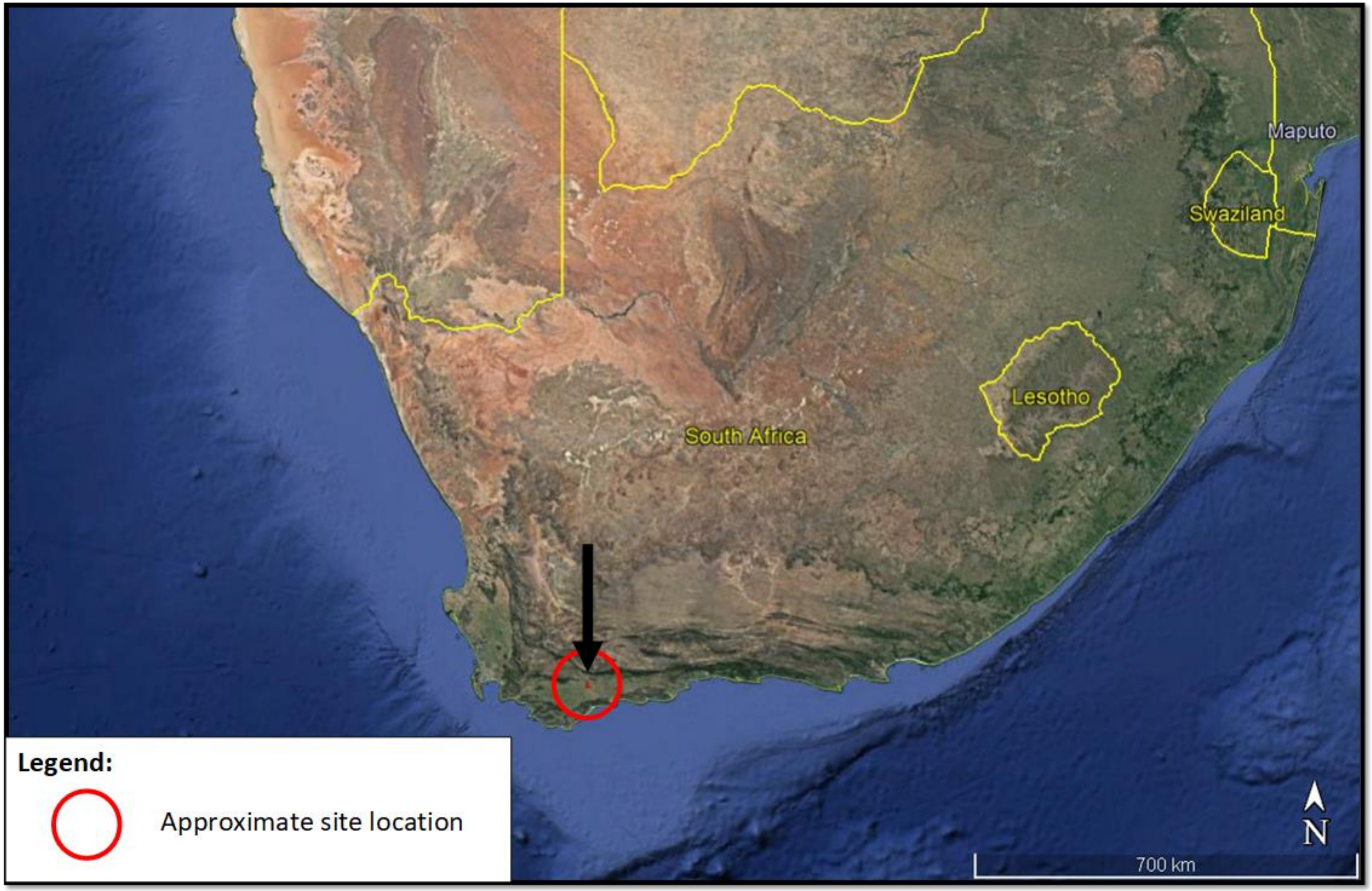


Figure 4.1 Site Locality Map – Broad Geographical Context – Western Cape Wind Energy Facility.

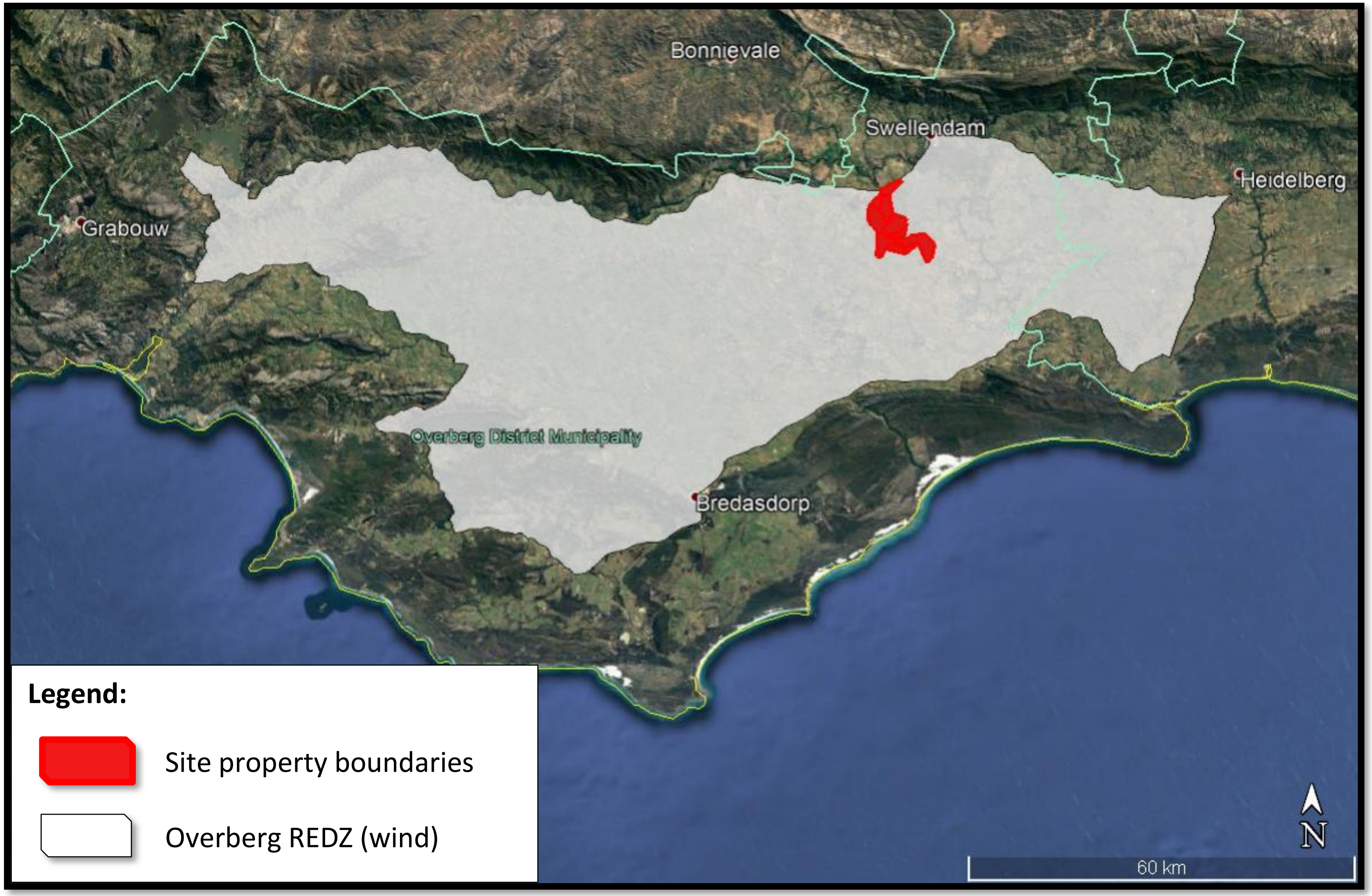


Figure 4.2: Site Locality Map – Local Context – Western Cape WEF.

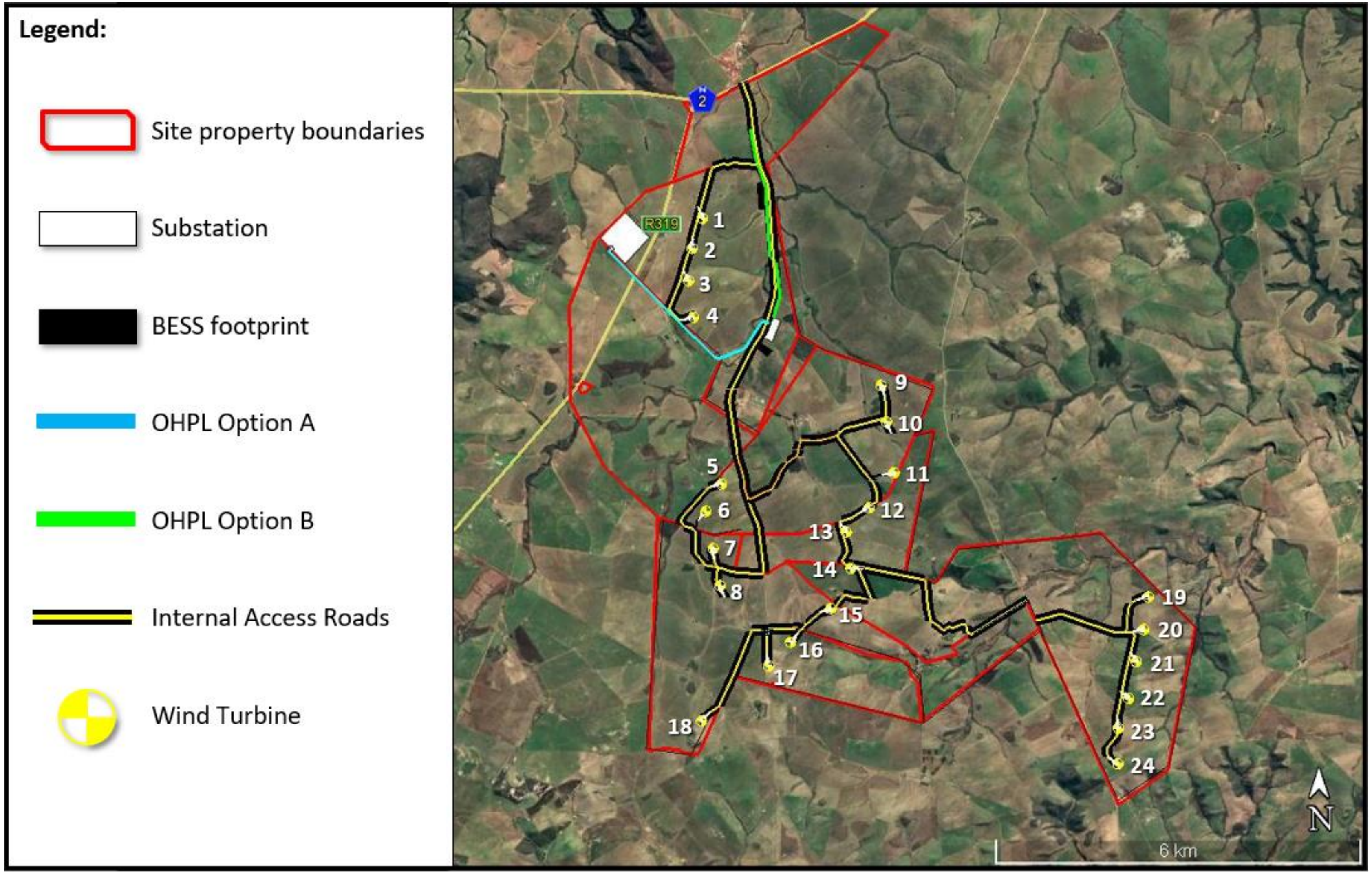


Figure 4.3: Layout Map – Preferred Alternative – Western Cape WEF.

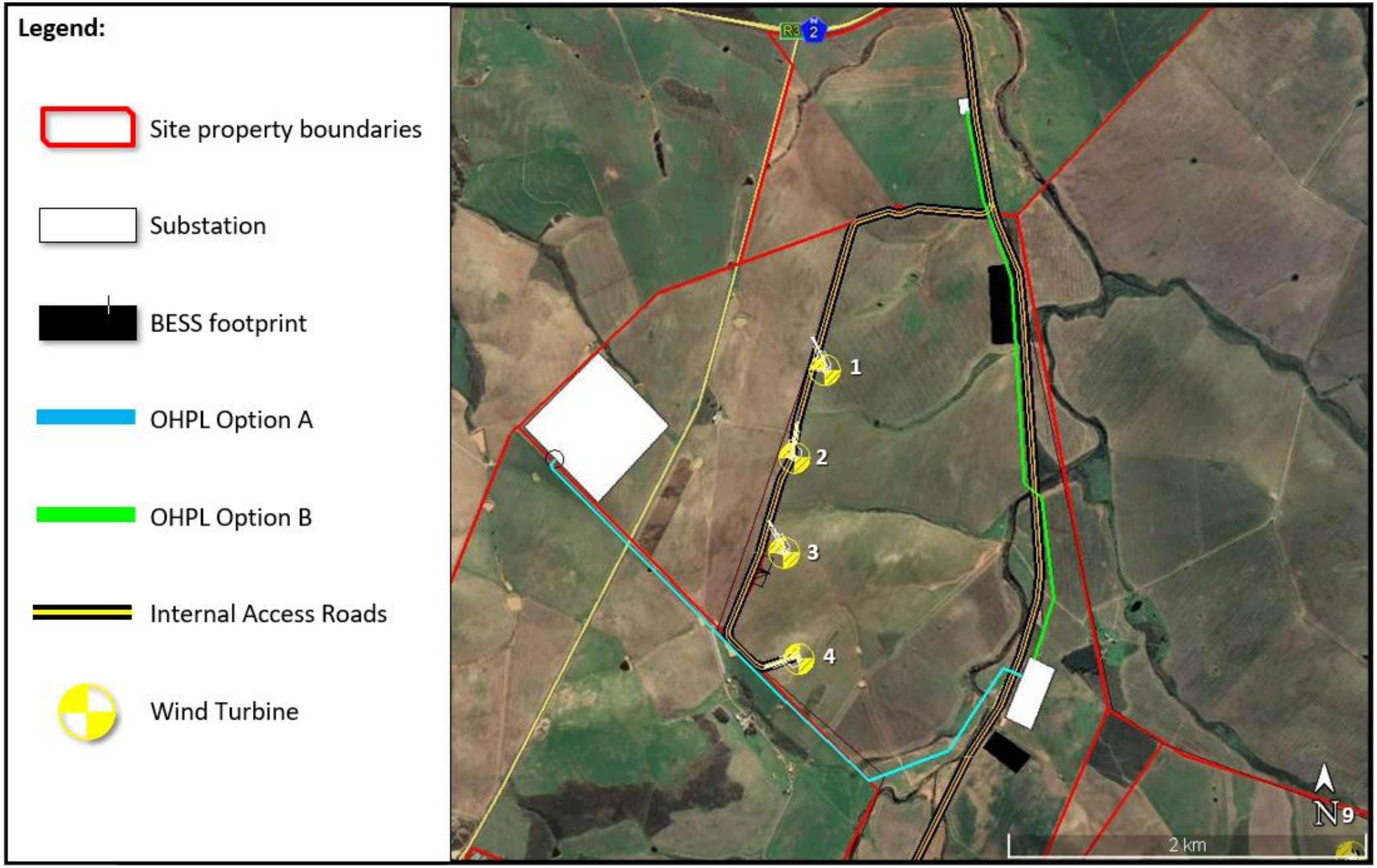


Figure 4.4: Layout Map - Close up view of the Northern Infrustructure, illustrating the locations of the OHPL, BESS and Substation options – Preferred Alternative – Western Cape WEF.

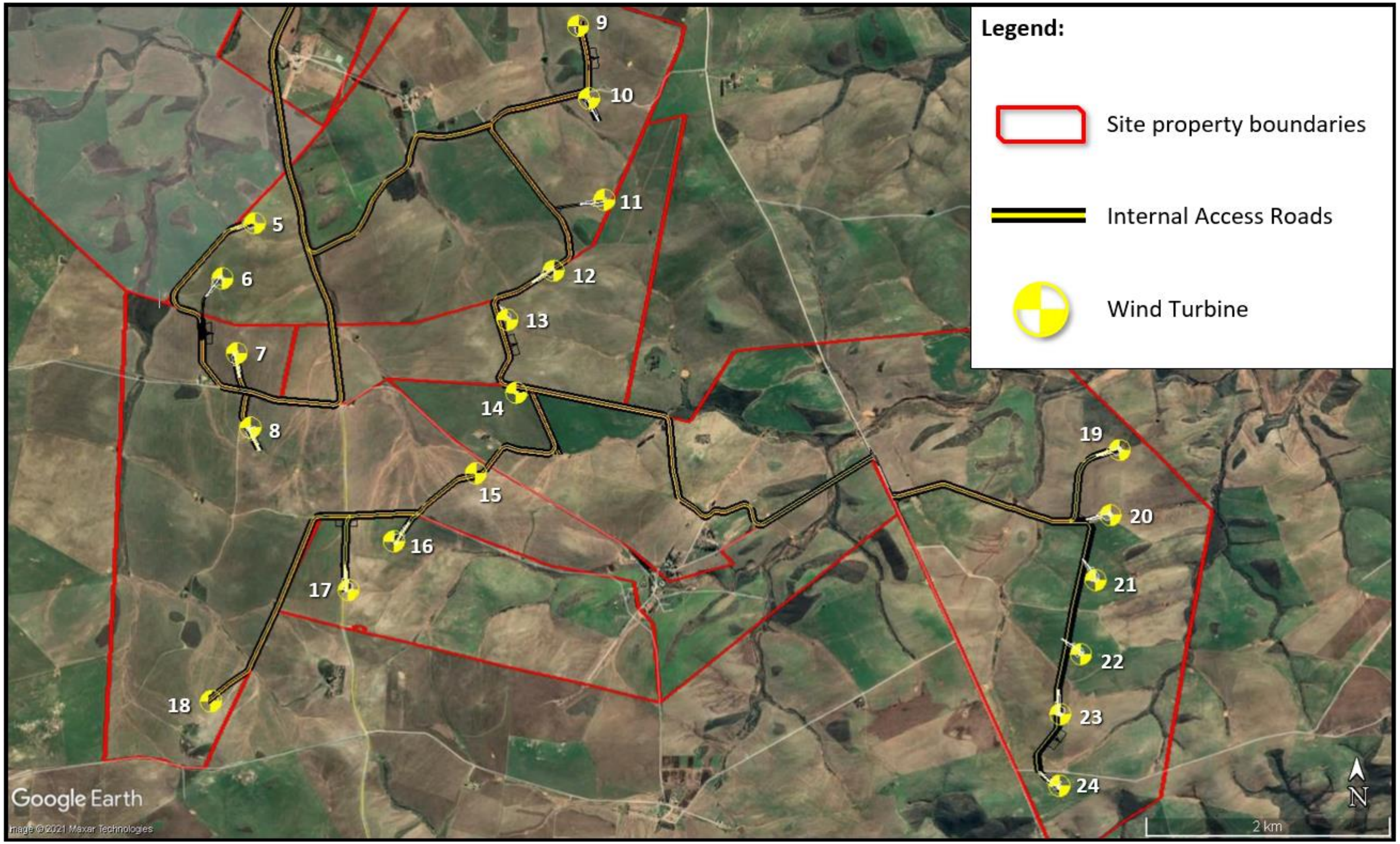


Figure 4.5: Layout Map - Close up view of the Southern Infrustructure – Preferred Alternative – Western Cape WEF.

The GPS co-ordinates of the proposed structures are included in this application are presented in the table below:

Table 4.4: This table details the GPS co-ordinates of the proposed structures.

POINT OF INTEREST	LATITUDE	LONGITUDE
WTG 1	34° 07' 29.05" S	20° 21' 08.58" E
WTG 2	34° 07' 44.52" S	20° 21' 01.96" E
WTG 3	34° 08' 01.64" S	20° 20' 59.59" E
WTG 4	34° 08' 20.94" S	20° 21' 02.98" E
WTG 5	34° 09' 48.28" S	20° 21' 20.99" E
WTG 6	34° 10' 02.72" S	20° 21' 10.99" E
WTG 7	34° 10' 22.19" S	20° 21' 15.49" E
WTG 8	34° 10' 41.64" S	20° 21' 20.04" E
WTG 9	34° 08' 56.56" S	20° 23' 03.21" E
WTG 10	34° 09' 15.62" S	20° 23' 06.71" E
WTG 11	34° 09' 42.25" S	20° 23' 11.56" E
WTG 12	34° 10' 00.80" S	20° 22' 55.58" E
WTG 13	34° 10' 13.52" S	20° 22' 40.97" E
WTG 14	34° 10' 32.57" S	20° 22' 43.79" E
WTG 15	34° 10' 53.45" S	20° 22' 31.00" E
WTG 16	34° 11' 11.30" S	20° 22' 05.25" E
WTG 17	34° 11' 23.88" S	20° 21' 51.22" E
WTG 18	34° 11' 52.75" S	20° 21' 08.03" E
WTG 19	34° 10' 47.51" S	20° 25' 54.80" E
WTG 20	34° 11' 04.62" S	20° 25' 51.87" E
WTG 21	34° 11' 21.56" S	20° 25' 47.01" E
WTG 22	34° 11' 40.91" S	20° 25' 42.13" E
WTG 23	34° 11' 56.48" S	20° 25' 35.61" E
WTG 24	34° 12' 15.18" S	20° 25' 35.25" E
BESS 1	34° 08' 27.59" S	20° 21' 53.38" E
BESS 2	34° 08' 37.41" S	20° 21' 48.00" E
OHPL 1 Start	34° 08' 23.44" S	20° 21' 51.31" E
OHPL 1 Middle	34° 08' 42.82" S	20° 21' 18.00" E
OHPL 1 End	34° 07' 45.00" S	20° 20' 09.39" E
OHPL 2 Start	34° 08' 20.42" S	20° 21' 54.24" E
OHPL 2 End	34° 07' 29.05" S	20° 21' 08.58" E
Substation	34° 06' 42.18" S	20° 21' 39.37" E

Bend points of the WEF development site perimeter (boundary) as requested by the DFFE:

1. 34° 6'26.43"S, 20°20'56.34"E
2. 34° 5'46.53"S, 20°22'50.80"E
3. 34° 5'52.91"S, 20°23'7.43"E
4. 34° 7'1.17"S, 20°21'50.44"E
5. 34° 8'30.12"S, 20°22'10.65"E
6. 34° 8'57.76"S, 20°23'36.87"E
7. 34° 9'22.75"S, 20°23'25.16"E
8. 34° 9'21.34"S, 20°23'36.85"E
9. 34°10'35.75"S, 20°23'19.04"E
10. 34°10'40.72"S, 20°23'38.24"E
11. 34°10'21.61"S, 20°23'52.21"E
12. 34°10'13.56"S, 20°25'24.86"E
13. 34°11'4.27"S, 20°26'25.48"E
14. 34°12'18.10"S, 20°26'7.37"E
15. 34°12'36.84"S, 20°25'36.17"E
16. 34°11'5.10"S, 20°24'44.28"E
17. 34°11'53.74"S, 20°23'30.15"E
18. 34°11'30.41"S, 20°21'28.44"E
19. 34°12'10.60"S, 20°21'6.24"E
20. 34°12'8.21"S, 20°20'34.18"E
21. 34°10'6.73"S, 20°20'39.67"E
22. 34° 9'39.86"S, 20°20'5.57"E
23. 34° 9'5.67"S, 20°19'43.86"E
24. 34° 8'14.87"S, 20°19'43.17"E
25. 34° 7'38.76"S, 20°20'1.91"E
26. 34° 7'14.87"S, 20°20'32.44"E
27. 34° 7'9.50"S, 20°20'50.47"E
28. 34° 6'34.33"S, 20°21'2.26"E

Figure 4.6: A visual overview of the activities and character of the land

5 SCOPE OF THE PROPOSED ACTIVITY

*In accordance with **Appendix 1 Regulation 2(d) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

i. All listed and specified activities triggered and being applied for;

ii. A description of the activities to be undertaken including associated structures and infrastructures.

5.1 DESCRIPTION OF PROPOSED ACTIVITIES AND DEFINING DEVELOPMENT ALTERNATIVES

5.1.1 Proposed Activities

During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed.

The Preferred Alternative for this Project is described as follows:

- Up to 24 WTGs with a total output of 140MW,
- Generation capacity of up to 5.6MW each,
- Each WTG will consist of a transformer, steel tower, hub, nacelle (gear box), and three rotor blades,
- Tower height of up to 120m,
- Total height up to a max of 200m,
- Battery Energy Storage Systems (BESS) associated with the WEF,
- 24 concrete foundations to support the turbine towers (15m x 15m x 2.5m in depth),
- 24 temporary turbine laydown areas of 80m x 30m (57 600m^2),
- A 132kV substation with high voltage (HV) yard footprint of approximately 100m x 100m (1000m2),
- Underground cabling between the WEF's components following existing roads,
- Two 132kV Overhead Powerline (OHPL) options connecting the WEF to an existing ESKOM network grid,
- Internal access roads (10m wide and 40km long) linking the wind turbines and the infrastructure on the site, and
- Operations and maintenance building including a storage facility with a footprint of 40m x 20m (800m2) for maintenance and storage purposes.

The total extent of the WEF, including all roads, laydown areas, WTGs and associated infrastructure is approximately 3 800ha.

The technical details are provided in table for below as per the request of the DFFE.

	Western Cape WEF
Applicant	WESTERN CAPE WIND FARM (PTY) LTD
Total number of WTG	24
WTG Rating	5.6MW
WTG Dimensions	Tower height: Up to 120m Total height: Up to 200m
Total WEF Generation Capacity (MW)	140MW
Temporary WTG laydown areas	24 (80m x 30m) (57 600m2)
Concrete support foundations	24 (15m x 15m x 2.5m in depth)
Transmission	132kV OHPL (2 options, dependent on Eskom future development plans)
Storage	2 BESS Options
Internal Access Roads	10m wide and 40km long
Operations and maintenance building including a storage facility	40m x 20m (800m2)

5.1.2 Development Alternatives

5.1.2.1 No-Go Alternative

The “no-go” option would result in the proposed activity not being implemented and the status quo on the property remaining.

Should the “No-Go” option be implemented, this will result in a loss of opportunity for the Applicant and the greater Overberg District, Western Cape Province and South Africa as a whole as it is recognised as a national priority for ‘improvements to infrastructure’ to ensure increased access to electricity and a ‘transition to a low-carbon economy’ as set out in the NDP. The development of the WEF will not be possible and this would not fulfil the requirements of the Overberg District Municipality IDP nor the WCPSDF, which recognises the need to invest in renewable energy and aims to ensure access to affordable, reliable, sustainable and modern energy for all through building resilient infrastructure.

The No Go alternative usually implies the continuation of the status quo in terms of development potential, zoning and management. The No-Go Alternative would not achieve the general purpose and requirements of the activity, which is to the development of the Western Cape WEF.

5.1.2.2 The Preferred Alternative

No property or "site" alternative was assessed as part of the Report. During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed. **As such, no alternative sites were investigated for the purpose of this BAR**

<u>The Preferred Alternative comprises the following:</u>

- Up to 24 WTGs with a total output of 140MW,
- Generation capacity of up to 5.6MW each,
- Each WTG will consist of a transformer, steel tower, hub, nacelle (gear box), and three rotor blades,
- Tower height of up to 120m,
- Total height up to a max of 200m,
- Battery Energy Storage Systems (BESS) associated with the WEF,
- 24 concrete foundations to support the turbine towers (15m x 15m x 2.5m in depth),
- 24 temporary turbine laydown areas of 80m x 30m (57 600m^2),
- A 132kV substation with high voltage (HV) yard footprint of approximately 100m x 100m (1000m^2),
- Underground cabling between the WEF's components following existing roads,
- Two 132kV Overhead Powerline (OHPL) options connecting the WEF to an existing Eskom network grid,
- Internal access roads (10m wide and 40km long) linking the wind turbines and the infrastructure on the site, and
- Operations and maintenance building including a storage facility with a footprint of 40m x 20m (800m^2) for maintenance and storage purposes.

Please note that the final footprints of the monopoles and/or lattice structures comprising the proposed WEF will be determined prior to construction phase commencing. Micro-siting of the preferred WEF layout will determine optimal sizes and positions of the infrastructures should an EA be granted.

5.2 DETAILED DESCRIPTION OF THE WEF

This Section of the report provides a detailed description of the WEF, OHPL, additional substation and associated infrastructure.

5.2.1 The Wind Turbine

A wind turbine is a device that converts wind energy (kinetic energy) into electricity[1]. The device extracts kinetic energy from the wind and converts this energy into mechanical energy. The mechanical energy is used to produce the electricity. Wind turbines rotate on a horizontal axis or on a vertical axis. Turbines, which are used, for commercial production of energy are predominantly located on a horizontal axis. The commercial wind turbines are usually three-bladed and pointed into the wind by computerised motors.

The amount of energy a wind turbine can produce is dependent on the wind velocity and the length of the rotor blades. Wind turbines begin to generate power at wind speeds of between 10 to 15km/hour. Generally wind speeds of 25 to 60km/hour are required for full power operation, however, this depends on turbine types selected per site. Wind turbines will automatically shut down in situations where the wind speed becomes too excessive for its operation. The proposed wind turbines will be designed in such a manner to operate continuously, unattended and with low maintenance for a period of approximately 25 years. Once the WEF is operating it can be monitored and controlled remotely, with a mobile team, which is only utilised when needed.

[1] *Information courtesy of Wikipedia (http://en.wikipedia.org/wiki/Wind_turbine)*

Photo 3.2: This photograph depicts a typical rotor with three blades attached to the hub of the wind turbine (Image courtesy of TMG).

5.2.1.1 *The Rotor and blades*

The rotor is the portion of the wind turbine, which collects the kinetic energy from the wind. The rotor consists of three, fibreglass blades, which rotate about on an axis (horizontal axis or vertical axis) at a rate that is determined by the wind speed and the shape of the blades. The blades are attached to the hub, which in turn is attached to the main shaft[2]. The rotor for typical utility-scale wind turbines contains three high tech blades, a hub and a spinner. The hub is usually made of a ductile cast iron and is one of the heaviest components of a turbine, weighing 8 to 10 tons for a 2MW turbine. The hub is designed to be rigid yet able to absorb a high level of vibration. The hub is covered by a nose cone. The nose cone is designed primarily with aesthetics in mind but can protect the hub slightly from the environment. The nose cone is manufactured with composites similar to those used for the blades[3].

The blades rotate at a constant speed of about 6 to 16 revolutions per minute (rpm) and range in diameter between 90m and 150m. The speed of the rotor blades is controlled by the nacelle. The blades of the wind turbine function in a similar way to the wing of an aircraft, utilising the principles of lift (Bernoulli) caused when air flows past the blade, a wind speed and pressure differential is created between the upper and lower blade surfaces.

[2] *Information courtesy of AvionexUSA (http://www.avionexusa.com/pdf/Main_Components_of_a_Wind_Turbine.pdf)*
[3] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*

5.2.1.2 *The Nacelle*

The nacelle of the wind turbine is the box-like compartment that is located on top of the tower and is connected to the rotor. The nacelle houses the majority of the turbine components (approximately 8000). The nacelle houses the gearbox, generator and transformer as well as some of the control electronics[4]. The nacelle box is made of fiberglass and protects the internal components from the environment. The nacelle cover is fastened to the main frame, which also supports all the other components inside the nacelle. The main frames are large metal structures that must be able to withstand large fatigue loads[5].

5.2.1.3 *The Generator*

The generator, which is situated in the Nacelle; converts rotational movement to electrical energy[6]. High power wind turbine doubly-fed asynchronous generators are most frequently used. Turbines using such generators can vary their operational rotating speed to a certain degree. These asynchronous generators allow for the synchronization with the grid and are very robust and require little maintenance. All generators have to be cooled and are equipped with a ventilator, which assists with cooling[7].

5.2.1.4 *Drive Train*

The electricity generating system is the heart of the wind turbine. The nacelle contains a rotor that drives a large shaft into a gearbox, which steps up the revolutions per minute to a speed suitable for the electrical generator. The wind turbine gearbox has to be sufficiently robust to handle the frequent changes in torque caused by changes in the wind speed[8]. The rotor shaft connects the rotor to the gearbox and is also known as a slow drive shaft. The gearbox converts the energy from a slowly rotating rotor to a quickly rotating generator. The drive train contains two types of brakes, the aerodynamic brake system and the mechanical system. The mechanical brake is fitted in a wind turbine to act as a supplementary brake, should the aerodynamic brake fail or should the wind turbine require repairs[9].

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[4] *Information courtesy of Wind Energy Planning (http://www.windenergyplanning.com/how-wind-turbines-work/)*
[5] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*
[6] *Information courtesy of Wind Energy Planning (http://www.windenergyplanning.com/how-wind-turbines-work/)*
[7] *Information courtesy of "The structure of a modern turbine" (http://www.wwindea.org/technology/ch01/en/1_2.html)*
[8] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*
[9] *Information courtesy of "The structure of a modern turbine" (http://www.wwindea.org/technology/ch01/en/1_2.html)*

5.2.1.5 *The Tower*

Typically, the tower is usually composed of steel and is cylindrical in shape, it can also be made of concrete. The tower supports the nacelle and rotor and the typical height of the structure is between 125m and 200m. Cables run down the interior of the tower conducting electricity from the generator located in the nacelle to the ground and then into the feed-in point into the Grid. Lifts or ladders are utilised by maintenance crew to access the nacelle[10]. The tower raises the wind turbine so that its blades safely clear the ground in order for it to reach the stronger winds at higher elevations. The tower needs to be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

Photo 3.3: This photograph depicts a typical cylindrical shape wind turbine tower (Image courtesy of TMG).

Wind has greater velocity at higher altitudes because of the drag created by the surfaces (sea or land) and the viscosity of the air. The variation in velocity with altitude is known as wind shear and is most dramatic near the surface. Doubling the altitude of a turbine increases the expected wind speeds by 10% and the expected power generation by 34%.

5.2.1.6 *The Foundation*

Typically, a concrete base is established which accommodates the wind turbine. The size of the concrete base is dependent on the size of the wind turbine. The foundations are designed to accommodate both the actual weight and lateral wind pressure. Typically, concrete foundations will need to be constructed for each turbine location. Concrete is typically batched

[10] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*

at an appropriate off site location and brought to the site when required via a ready mixed cement truck.

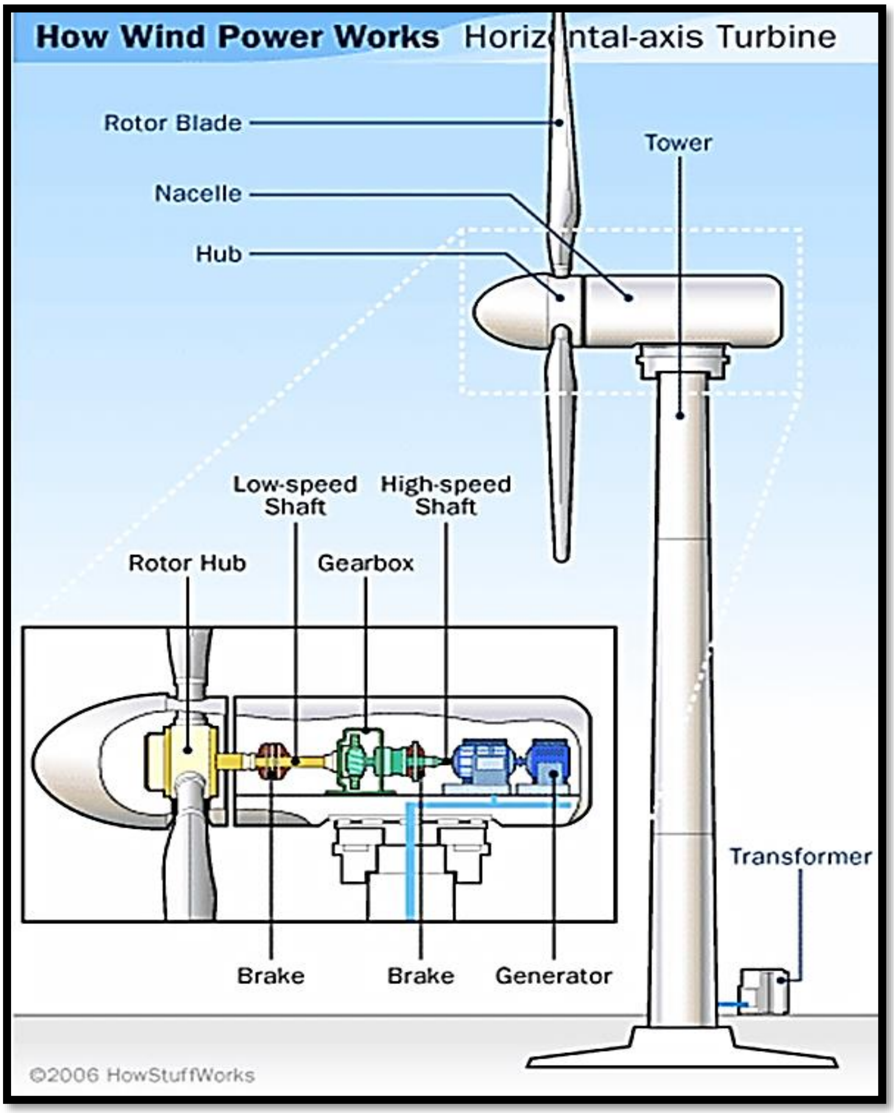


Figure 3.4: This illustration shows the different parts of the wind turbine[11]

[11] *Figure Courtesy of Express How Stuff Works (http://express.howstuffworks.com/exp-wind-power.htm)*

5.2.2 The Operating Characteristics of Wind Turbines

The wind turbine is operated by the wind. The turbine hub turns into the wind when the wind begins to blow. The wind passes over the blades and turns the rotor. The blades are shaped differently on the wind catching side and this means that air flows more quickly over one side of blade than the other[12].

Wind turbines operate at certain wind speeds. The wind turbine can only operate when there is sufficient wind to turn the blades, which typically is between 3 to 4m/s (10.8km/h to 14.4km/h).

When the wind speeds reach 25m/s, the wind turbines will shut down so as not to damage the turbine from the excessive load of wind[13].

Instruments within the nacelle measure the wind speed and direction. As wind speeds increase the energy output of the wind turbine increases as well. The maximum capacity to produce energy of a wind turbine is reached at approximately 15m/s of wind speed. The limit has to be set so as to define the size of the various components such as the gearbox, generator, cables and rotor blades[14].

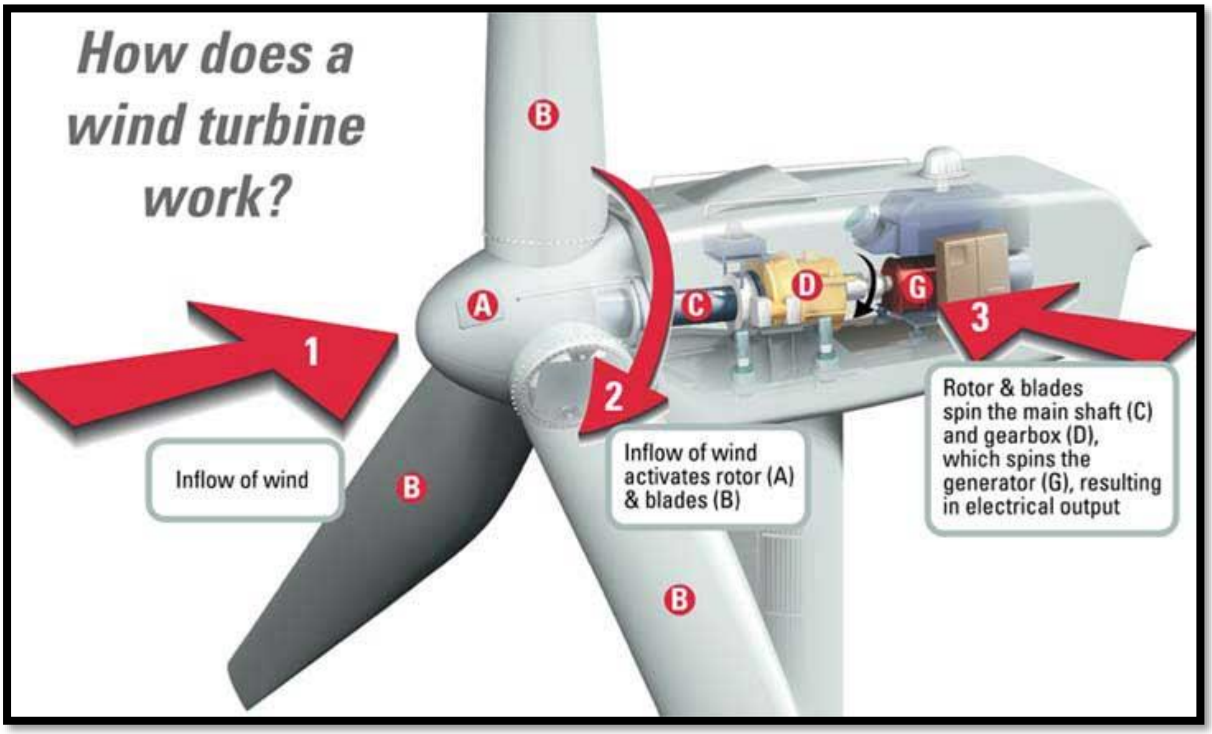


Figure 3.5: This illustration depicts the way in which a turbine works. Picture courtesy of techie nation[15].

[12] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*
[13] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*
[14] *Information courtesy of American Wind Energy Association (AWEA) (http://www.awea.org/issues/supply_chain/Anatomy-of-a-Wind-Turbine.cfm)*
[15] *Figure courtesy of Techie Nation (http://www.techienation.com/2008/08/14/understanding-wind-power-wind-generators-turbines/)*

The applicant intends to use the industry's highest producing onshore low wind turbine, designed for a broad range of wind and site conditions. The turbines will be selected on account of their reliability, serviceability, and exceptional energy capture. The turbines will be selected at a later stage, as is industry standard.

5.2.3 Description of OHPL

Based on information provided by the Applicant and advised by Eskom, the proposed 132kV line is required to be comprised of monopoles and/or lattice structures, which run the electrical cabling above ground. The monopoles and/or lattice structures are considered desirable in terms of requisite infrastructure, and this is detailed in this section of the report.

The proposed powerline will be up to 3.5km, depending on which option will be chosen, in length and will be constructed using monopoles and/or lattice structures for both strain lines and angled bends, which will be placed approximately 100m to 300m apart. The maximum height above ground is approximately 30m and the width of the servitude will be 40m.

Pylons will be constructed each with a base area of approximately 20m x 20m.

5.2.3.1 Servitude

It is a requirement of Eskom that 132 kV powerlines are located on a servitude of 40 m width. The associated servitude for the overhead powerline will have a width of 40m (20m on either side of the centre line of the power line). Access to the overhead powerline will be required during both the construction and operational phases of the project and the servitude will be cleared and maintained for this purpose. Maximum use of any existing servitudes and existing roads shall be made in order to gain access to construction sites and the servitude.

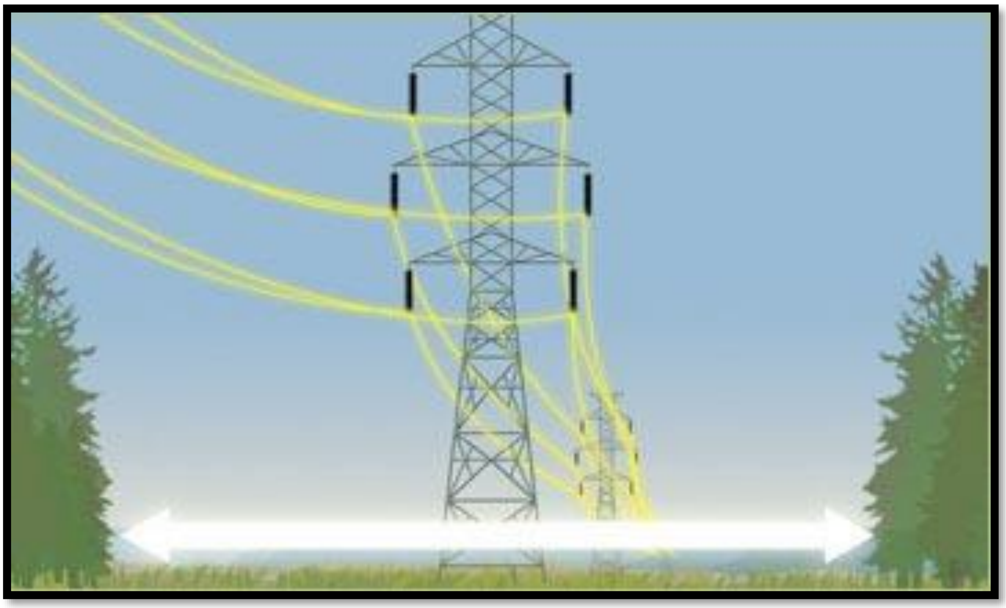


Figure 5.1: This figure shows a typical servitude cleared underneath the powerline route.[16]

5.2.3.2 Lattice OHPL Structure

A typical steel lattice transmission structure requires an average of 14,000kg of steel per structure. Lattice steel towers are typically supported by shallow gravity pad foundations (see Figure 5.3) at a depth of approximately 1 metre. Guyed towers may involve dead man gravity anchors and/or drilled anchors to support the tower (see Photo 5.4 below).

[16] http://www.hydroquebec.com/electricity-and-you/servitudes-and-property-rights/transmission-lines-substations/

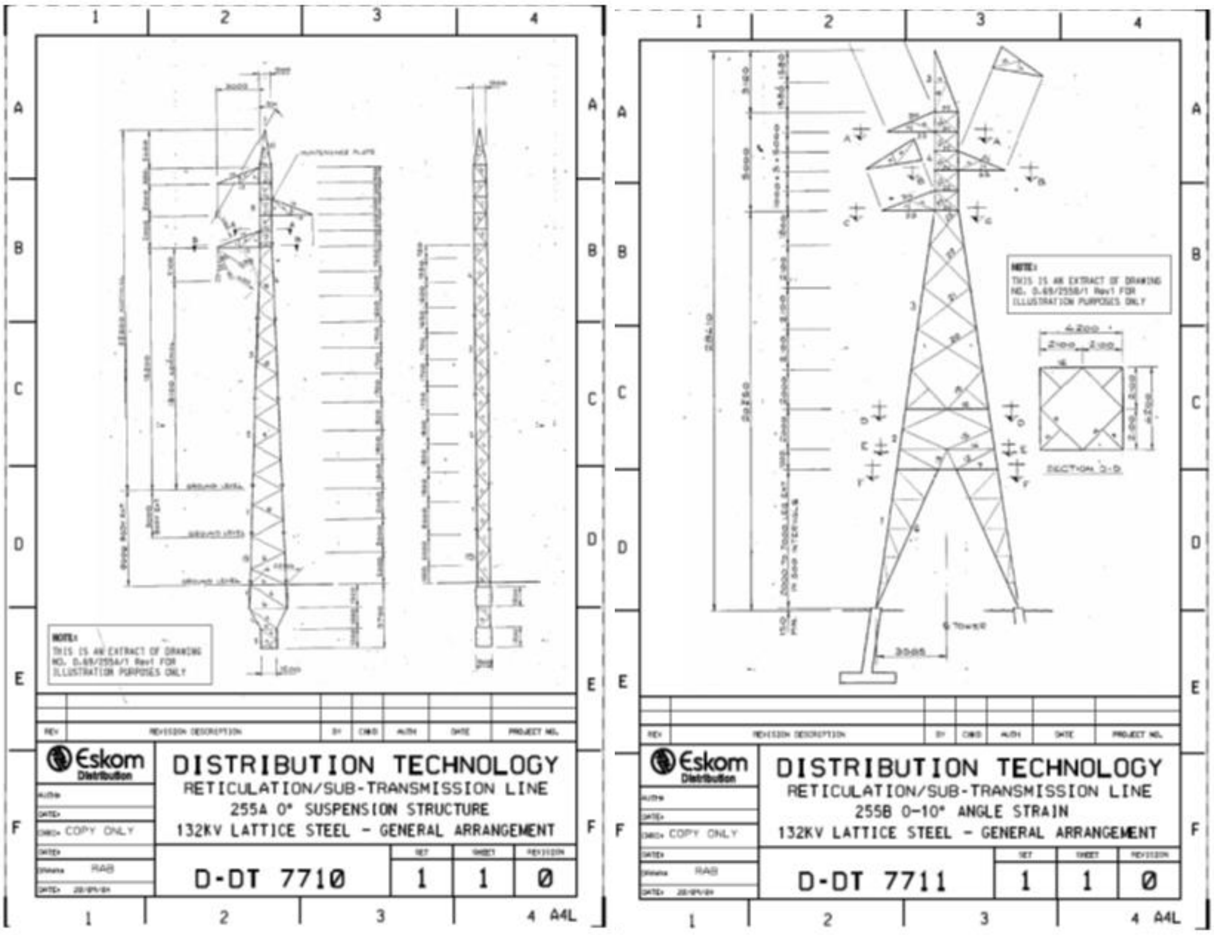


Figure 5.2: This Figure depicts the typical lattice structure considered for the overhead powerline (Photo courtesy of Eskom, 2017).

Photo 5.3: This Figure depicts the typical gravity foundation of lattice steel self-supported transmission towers (Photo courtesy of Outeniqua Geotechnical Services, 2017).

Photo 5.4: Typical dead man anchor foundations for guyed towers (Photo courtesy of Outeniqua Geotechnical Services, 2017).

5.2.3.3 Monopoles

A typical steel monopole transmission structure requires around 18,000kg of steel per structure. Monopoles typically have single pier foundations, which consists of a cylindrical cement column to support the monopole above. Monopoles require a concrete cap at the foot of each steel monopole structure with an approximate diameter of 750mm (see Photo 5.5 below).

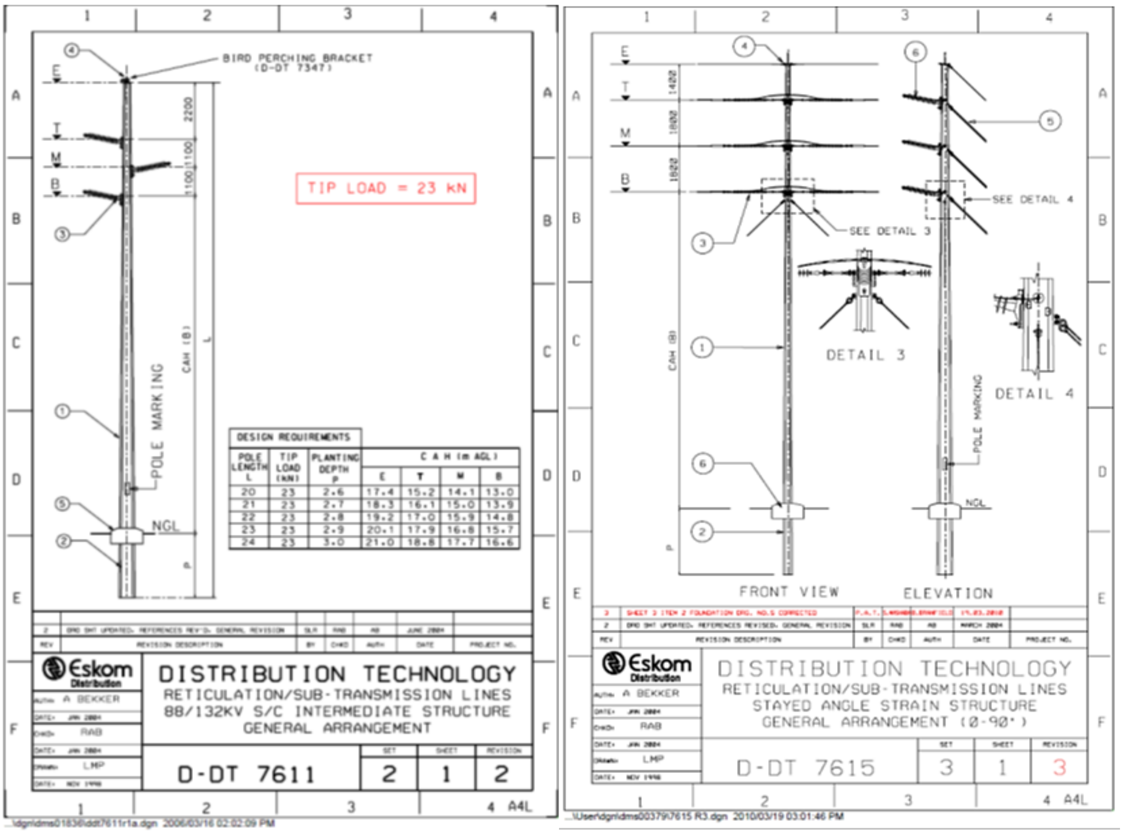


Figure 5.5: This Figure depicts the typical monopoles considered for the overhead powerline (Photo courtesy of Eskom, 2017).

5.2.3.4 Statutory Safety Clearance Requirements

Statutory safety clearances for power lines are stipulated by the Occupational Health and Safety Act (85 of 1993). For 132kV Powerlines, a minimum 1.45msafety clearance is required to be implemented. The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 3.8m, while the minimum vertical clearance between the conductors and the ground is 6.7m. The minimum distance of a 132kV distribution line running parallel to public roads is 95m from the centreline of the powerline to the centreline of the road servitude. The minimum distance between any part of a tree or shrub and any bare phase conductor of a 132kV distribution line must be 3.8m to allow for the possible lateral movement of this vegetation that could be a potential hazard for distribution lines that are operational and energised.

5.2.4 Substation

A substation will be constructed, and in consultation with Eskom to ensure all current Eskom standards are complied with. The substation facility will be approximately 250m x 250m (or 6.25 ha).

5.2.5 Battery Energy Storage System (BESS)

Two BESS will be constructed to store excess electricity during time of excess production.

5.2.6 Service Road

Existing roads will be used for the substation. Some roads may be upgraded to accommodated heavy vehicles.

5.2.7 Turbine Laydown Areas

24 turbine laydown areas of 80m x 30m will be used during construction of the wind turbines, for a total cleared area of 57 600m^2.

5.3 LISTED ACTIVITIES TRIGGERED

The following approach to the Environmental Application and process for the proposed ***Activity*** is based on the provisions stipulated in section 24(5) of NEMA (as amended) and the EIA Regulations (2014, as amended) contained in GNRs. 326, R. 327, R. 325 and R. 324, which dictate that a Basic Assessment Environmental Application process be followed as the proposed Western Cape WEF is located within a REDZ. The reasons for such as well as the listed activities triggered and therefore relevant to this Basic Assessment are presented below.

The full list of Listed Activities considered in this Basic Assessment are therefore given below:

Table 5.2: Summary table of the listed activities proposed for the Western Cape WEF.

GNR (LN)	GNR Date	Activity	Theme
GNR 327 (LN1)	2017	Activity 11.	Transmission and Distribution of Electricity.
		Activity 12.	Development within or within 32 metres of a watercourse.
		Activity 19.	Infilling or depositing of any material within watercourse.
		Activity 24.	Road Development.
		Activity 28.	Industrial development of Agricultural Land
		Activity 56.	Widening or lengthening of existing Roads.
GNR 325 (LN2)	2017	Activity 1.	Generation of Electricity (Renewable).
		Activity 15.	Clearance of vegetation.
GNR 324 (LN3)	2017	Activity 4.	Road Development. (Within the Western Cape)
		Activity 12.	Clearance of vegetation. (Within the Western Cape)
		Activity 18.	Widening or lengthening of existing Roads. (Within the Western Cape)

EIA Regulations – Listed Activities (as discussed and agreed with the Competent Authority)

Based on the information currently available on the proposed Project, it is anticipated that the following Listed Activities contained in **Listing Notice 1, Listing Notice 2 and Listing Notice 3** would require a Basic Assessment process in terms of the NEMA as the development is located within a REDZ:

GNR 327 - Listing Notice 1: Activity 11
The development of facilities or infrastructure for the transmission and distribution of electricity- *(i)* ***outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts****; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* *Excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is =* *Temporarily required to allow for maintenance of existing infrastructure;* *2 kilometres or shorter in length;* *Within an existing transmission line servitude; and* **(a)** *Will be removed within 18 months of the commencement of development.*
The Applicant has proposed to establish a WEF and as part of this requires to construct an onsite 33/132KV step up substation, which will convert the electricity produced by the WEF into the existing ESKOM electricity grid network via a new 132kV Overhead Powerline Route (OHPL). The substation has been proposed to be located on the site and the site is located outside the ambit of an urban area.

GNR 327 - Listing Notice 1: Activity 12
The development of- *i. Dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or* *ii. Infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c)* ***if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse****; -* *excluding-* *(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;* *(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;* *(dd) where such development occurs within an urban area;* *(ee) where such development occurs within existing roads, road reserves or railway line reserves; or* *(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.*
The Applicant has proposed to establish a WEF and the proposed site is traversed by several water courses. The WEF infrastructure (e.g. roads, turbines, crane pads, substation, etc) have physical footprints in excess of 100 square metres and some may be located within 32 metres of the edge of a watercourse.

GNR 327 - Listing Notice 1: Activity 19
The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; *But excluding where such infilling, depositing, dredging, excavation, removal or moving-* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.*
The establishment of the Western Cape WEF will likely require the movement of more than 10 cubic meters of material within a watercourse.

GNR 327 - Listing Notice 1: Activity 24
The development of a road— [a road] with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres
The construction of the Western Cape WEF will likely involve alterations to existing roads.

GNR 327 - Listing Notice 1: Activity 28
Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: *i. will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or* *ii. will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*
The Applicant has proposed to establish a WEF which will span over an area of approximately 3800ha.

GNR 327 - Listing Notice 1: Activity 56
The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— *(i) where the existing reserve is wider than 13,5 meters; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres;* *excluding where widening or lengthening occur inside urban areas.*
The construction of the Western Cape WEF will likely involve alterations to existing roads.

Based on the information available on the proposed Project, it is anticipated that the following Listed Activities contained in **Listing Notice 2** require a Scoping and EIA Process in terms of the NEMA:

GNR 325 - Listing Notice 1: Activity 1
The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs – *(a) within an urban area; or* *(b) On existing infrastructure.*
The Applicant has proposed to establish an 140MW wind energy facility (WEF), which is above the threshold of 20MW, outside an urban area.

GNR 325 - Listing Notice 1: Activity 15
The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- *i. the undertaking of a linear activity; or* *ii. maintenance purposes undertaken in accordance with a maintenance management plan.*
It is unlikely that any natural vegetation will be cleared as part of the construction of the Western Cape WEF, however some vegetation may be disturbed during the construction phase.

Based on the information available on the proposed Project, it is anticipated that the following Listed Activities contained in **Listing Notice 3** require a Basic Assessment Process in terms of the NEMA:

GNR 324 - Listing Notice 3: Activity 4
The development of a road wider than 4 metres with a reserve less than 13.5 metres. *(a) Western Cape* *(i) Areas zoned for use as public open space or equivalent zoning;* *(ii) Areas outside urban areas;* *(aa) Areas containing indigenous vegetation;* *(bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or* *(iii) Inside urban areas:* *(aa) Areas zoned for conservation use; or* *(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.*
The Applicant has proposed to establish a WEF with gravel roads (associated infrastructure), which will have a width of up to 10m in certain areas.

GNR 324 - Listing Notice 3: Activity 12
The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. *(i) Western Cape* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;* *iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;* *iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or* *v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.*
It is unlikely that any natural vegetation will be cleared as part of the construction of the Western Cape WEF, however some vegetation may be disturbed during the construction phase.

GNR 324 - Listing Notice 3: Activity 14
The development of- *i. Dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or* *ii. Infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse measured from the edge of a watercourse;* *excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* ***(i)*** *Western Cape* Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention;
The Applicant has proposed to establish a WEF and the proposed site is traversed by several water courses. The WEF infrastructure (e.g. roads, turbines, crane pads, substation, etc) have physical footprints in excess of 10 square metres and some may be located within 32 metres of the edge of a watercourse

GNR 324 - Listing Notice 3: Activity 18
The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. *Areas zoned for use as public open space or equivalent zoning;* *ii. All areas outside urban areas:* *(aa) Areas containing indigenous vegetation;* *(bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or* *iii. Inside urban areas:* *(aa) Areas zoned for conservation use; or* *(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.*
The Applicant has proposed to establish a WEF with gravel roads (associated infrastructure), which will have a width of up to 10m in certain areas.

This application for EA will be submitted to and considered by the DFFE as the appropriate Competent Authority for the Application.

Based on the above the project is subject to a BA process due to the site being located within the Overberg REDZ as gazetted in GN No. 114 of 16 February 2018.

6 LEGISLATIVE CONTEXT

*In accordance with **Appendix 1 Regulation 3(e) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**, the following information is presented in Section 5:*

i. An identification of all legislation, policies, plans and guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and have been considered in the preparation of the report

ii. How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments

6.1 SOUTH AFRICAN LEGISLATION (NATIONAL)

The information below has been extracted from the Socio-Economic Scoping Report (dated September 2017 and attached in Appendix D), which forms part of the professional team inputs for the Project.

The national policy environment, clearly outlines the need, desire and intention to increase the reliance on renewable energy as a key source of power. These commitments are outlined in various Acts, White Papers, development plans and framework, specifically including:

- *National Energy Act (2008).*
- *White Paper on Energy Policy of the Republic of South Africa (December 1998).*
- *White Paper on Renewable Energy (November 2003).*
- *National Development Plan.*
- *National Integrated Resource Plan for Electricity (2010-2030).*
- *National Infrastructure Plan, 2010.*
- *Integrated Development Plans.*
- *Spatial Development Frameworks.*

The policy and planning frameworks regarding energy are all underpinned by the need for the delivery of electricity to all South Africans to support social and economic health and ongoing development. The construction and operation of the proposed Western Cape *WEF will enable the generation of an additional 140MW of power, which will be fed into the national grid and distributed throughout the country.[17]. Therefore, the policies that support renewable power generation also support the need for the Western Cape WEF and supporting infrastructure.*

Powerlines are subject to specified building line restrictions, servitude widths, line separations and clearances from other powerlines. The building restriction on either side of a 132kV powerline (measured from the centre line is required to be ~18m (15.5-20m) and the distance between two parallel powerlines should be ~15m (21-24m)[18].

[17] Distribution will be limited by the Eskom distribution infrastructure.
[18] Eskom Distribution, March 2011 (reviewed March 2016), building line restrictions, servitude widths, line separations and clearances from other powerlines: Distribution Guide – Part 19.

6.1.1 National Environmental Management Act (Act No. 107 of 1998)

In terms of NEMA, as amended and the NEMA EIA Regulations, 2014 as amended, an application for EA for certain listed activities is required to be submitted to either the Provincial Environmental Competent Authority, or the National Competent Authority (DEA):

- The current NEMA EIA regulations, GN R.326, GN R.327, GN R.325 and GN R.324, promulgated in terms of Sections 24(5), 24M and 44 of the NEMA and subsequent amendments, commenced on 08 December 2014 (and amended in April 2017).
- GN R.326 lists those activities for which a Basic Assessment is required.
- GN R.327 lists the activities requiring a full EIA (Scoping and Impact Assessment phases).
- GN R.325 lists certain activities and competent authorities in specific identified geographical areas.
- GN R.324 defines the EIA processes that must be undertaken to apply for EA.

6.1.2 National Water Act (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) is the primary legislation regulating both the use of water and the pollution of water resources. It is applied and enforced by the Department of Water Affairs (DWA). Section 19 of NWA regulates pollution, which is defined as "the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it:

- less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- harmful or potentially harmful to -
- the welfare, health or safety of human beings;
- any aquatic or non-aquatic organisms;
- the resource quality; or
- Property.

The persons held responsible for taking measures to prevent pollution from occurring, recurring or continuing include persons who own, control, occupy or use the land. This obligation or duty of care is initiated where there is any activity or process performed on the land (either presently or in the past) or any other situation which could lead or has led to the pollution of water.

The following measures are prescribed in the section 19(2) of the NWA to prevent pollution:

- cease, modify or control any act or process causing the pollution;
- comply with any prescribed standard or management practice;
- contain or prevent the movement of pollutants;
- eliminate any source of the pollution;
- remedy the effects of pollution; and
- remedy the effects of any disturbance to the bed or banks of a watercourse.

Section 21 of the NWA lists the water uses for which a water use licence (WUL) is required. In terms of the NWA, water uses include the following activities:

a) *Taking water from a water resource;*
b) *Storing water;*

c) *Impeding or diverting the flow of water in a watercourse;*
d) *Engaging in a stream flow reduction activity contemplated in section 36;*
e) *Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);*
f) *Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea*
g) *outfall or other conduit;*
h) *Disposing of waste in a manner which may detrimentally impact on a water resource;*
i) *Disposing in any manner of water which contains waste from or which has been heated in, any industrial or power generation process;*
j) *Altering the bed, banks, course or characteristics of a watercourse:*
k) *Removing, discharging or disposing of water found underground if it is necessary for the efficient*
l) *continuation of an activity or for the safety of people; and*
m) *Using water for recreational purposes.*

6.1.3 National Heritage Resource Act (Act No. 25 of 1999)

The National Heritage Resources Act (NHRA) governs the management of heritage resources which are of cultural significance. The South African Heritage Resources Agency (SAHRA) is the national body responsible for the protection of South Africa's cultural heritage resources.

Section 38(3) of the NHRA requires that all heritage resources are identified and assessed and that any comments and recommendations of the relevant heritage resources authority with regard to the proposed development have been taken into account prior to the granting of the consent.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (Section 2 (d) (xxi)).

6.1.4 Civil Aviation Act (Act No. 13 Of 2009)

The purpose of this act is to repeal, consolidate and amend the aviation laws giving effect to certain International Aviation Conventions; to provide for the control and regulation of aviation within the Republic; to provide for the establishment of a South African Civil Aviation Authority with safety and security oversight functions; to provide for the establishment of an independent Aviation Safety Investigation Board in compliance with Annexure 13 of the Chicago Convention; to give effect to certain provisions of the Convention on Offences and Certain other Acts Committed on Board Aircraft; to give effect to the Convention for the Suppression of Unlawful Seizure of Aircraft and the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation; to provide for the National Aviation Security Program; to provide for additional measures directed at more effective control of the safety and security of aircraft, airports and the like; and to provide for matters connected thereto.

6.1.5 National Energy Act (Act No 34 of 2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including wind:

"To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies…" (Preamble).

6.1.6 White Paper on the Energy Policy of the Republic of South Africa

The White Paper on Energy Policy of the Republic of South Africa (December 1998) states that "Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential". Furthermore, it recognizes that "Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

<u>Government policy on renewable energy is thus concerned with meeting the following challenges:</u>

- *Ensuring that economically feasible technologies and applications are implemented;*
- *Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options; and,*
- *Addressing constraints on the development of the renewable industry.*

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive and many appropriate applications exist.

6.1.7 White Paper on Renewable Energy

This White Paper on Renewable Energy (November, 2003) (further referred to as the White Paper) supplements the White Paper on Energy Policy, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well-endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have *thus far remained largely untapped. As signatory to the Kyoto Protocol[19], Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.*

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidized alternative to fossil fuels. The medium-term (10-year) target set in the White Paper is:

10 000GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667MW) of the projected electricity demand for 2013 (41539MW) (Executive Summary, ix).

6.1.8 National Integrated Resource Plan for Electricity (2010-2030)

The Integrated Resource Plan (IRP) outlined the preferred energy mix to meet electricity needs over a 20-year planning horizon from 2010 to 2030. In line with the national commitment to transition to a low carbon economy, 17,800MW of the 2030 target are expected to be from renewable energy sources, with 5,000 MW to be operational by 2019 and a further 2,000MW (i.e. combined 7,000MW) operational by 2020. The majority of the anticipated renewable energy is proposed to come from onshore wind and solar projects. In addition, through power generation, there are requirements to contribute towards socio-economic and environmentally sustainable growth. Social and local economic benefits are created via job creation and training programmes, community ownership schemes, improved quality of life and levels of sustainability.

[19] The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."[The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia)

6.1.9 National Development Plan

Key priority areas, with applicable targets and actions were identified by the planning commission in the National Development Plan's (NDP) vision for 2030. Of relevance, the plan prioritises 'improvements to infrastructure' to ensure increased access to electricity and a 'transition to a low-carbon economy'. The NDP identifies the need for South Africa to invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. A critical component is energy infrastructure, which underpins all economic activity and facilitates growth. The NDP requires the development of 10,000MWs of additional electricity capacity by 2025 (44,000MWs was being generated in 2013).

6.1.10 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs, and strengthen the delivery of basic services. The plan also supports the integration of African economies. The Minister of Finance, Mr Pravin Gordhan, announced in his 2013 Budget Speech that, in terms of the plan, Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure.

*These investments will improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. On the other hand, investment in the construction of ports, roads, railway systems, **electricity plants**, hospitals, schools and dams will contribute to faster economic growth.*

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee . The Committee has identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and comprise:

- *Five geographically-focused SIPs*
- *Three spatial SIPs*
- *Three energy SIPs*
- *Three social infrastructure SIPs*
- *Two knowledge SIPs*
- *One regional integration SIP*
- *One water and sanitation SIP*

The Three Energy SIPS are SIP 8, 9 and 10.

SIP 8: 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 Integrated Resource Plan (IRP2010).*
- *Support bio-fuel production facilities.*

SIP 9: Electricity generation to support socio-economic development

- *Accelerate the construction of new electricity generation capacity in accordance with the IRP2010 to meet the needs of the economy and address historical imbalances.*
- *Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.*

SIP 10: 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.*
- *Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.*

6.1.11 Spatial Planning and Land Use Management Act

In 2013, land use planning was influenced by the promulgations of the Spatial Planning and Land Use Management Act (2013) (SPLUMA) which outlines a set of principles to influence spatial planning, land use management and land development. The general principles of SPLUMA are that spatial planning, land use management and land development must promote and enhance spatial justice, spatial sustainability; efficiency; spatial resilience, and good administration. (IDP) and SDF are the key planning instruments used by municipalities for new developments (whether residential or commercial). Across the country all municipal operations are governed by the Municipal Systems Act (Act No. 32 of 2000). This Act stipulates that all municipalities must prepare and implement an IDP for their area of jurisdiction, which should include an SDF. The IDP and SDF are reviewed annually to accommodate new priorities or to maintain existing ones.

The IDP is a tool for municipal planning and budgeting to enable them to deliberate on developmental issues identified by communities. Each IDP should have a five-year lifespan that is linked directly to the term of office for local councillors.

The purpose of the SDF as a land-use management tool is to plan, direct and control development but it does not provide land use rights. It provides the necessary guidance for land uses at local level in order to ensure the application of the development principles of sustainability, integration, equality, efficiency and fair and good governance in order to create quality of living, investor confidence and security of tenure.

6.1.12 Renewable Energy Development Zones and Power Corridors

The site is located within one of the gazetted Renewable Energy Development Zones (REDZ). The REDZ are zones that have been identified by the DEA in consultation with an independent professional team, which comprised of Visual, Bird, Bat, Biodiversity, Socio-Economic, Archaeological, Palaeontological and Freshwater Consultants and whom provided inputs to identify these REDZs. Please refer to the Figures 6.1 and 6.2 below, which shows the eight Phase 1 and three Phase 2 REDZs respectfully.

The following information has been extracted from the DEA website, which depicts the actual statement which was issued to the Public on 17 February 2016.

Cabinet on Wednesday, 17 February 2016, approved the gazetting of 8 Renewable Energy Development Zones (REDZ) and 5 Power Corridors. (Note that an additional REDZ were gazetted on 26 February 2021)

These Renewable Energy Development Zones and Power Corridors are geographical areas where wind and solar Photovoltaic technologies can be incentivized and where 'deep' grid expansion can be directed and where regulatory processes will be streamlined.

The REDZs act as energy generation hubs and provide anchor points for grid expansion thereby allowing for strategic and proactive expansion of grid into these areas. This will ensure that the grid expansion does not hamper the progress of the renewable energy power purchase agreement process.

The REDZs and Power Corridors support 2 of the 18 SIPs which were identified in the Infrastructure Development Plan which is aimed at promoting catalytic infrastructure development to stimulate economic growth and job creation.

To ensure that when required, environmental authorisations are not a cause for delay, the DEA embarked on a program of Strategic Environmental Assessments (SEAs) for large-scale developments to support the SIPs. The intention of undertaking SEAs is to pre-assess environmental sensitivities within the proposed development areas at a regional scale to simplify the site-specific EIA when they are undertaken, and to focus the assessment requirements to addressing the specific sensitivity of the site.
The REDZs and Power Corridors were identified through the development of three SEAs as part of the Departments Strategic Environmental Assessment programme. The outputs of these three SEAs must now be gazetted to allow them to be implemented.

The outputs of the SEAs directly relate to several government priorities including:

- *Contributing to reducing present current energy constraints by facilitating renewable energy development in strategic areas in South Africa;*
- *Addressing the major objectives of the National Development Plan, namely transitioning to a low carbon economy, developing infrastructure to create jobs and reducing the regulatory burden and the cost of doing business;*
- *Contributing to achieving the renewable energy target identified in the Integrated Resource Plan and implementing the renewable energy independent power producers program (REI4P) implemented by the Department of Energy and National Treasury;*
- *Promoting the green economy and sustainable development; and*
- *Promoting intergovernmental coordination and integrated authorisations.*

The outcome of the gazetting process means that wind and solar PV activities within the eight [now eleven] *Renewable Development Zones and electricity grid expansion within the five Power Corridors will be subjected to a Basic Assessment and not a full EIA process.*

This reduces the review and decision-making time and the level of assessment required for each project based on the fact that scoping level pre-assessment was already undertaken in those areas. From an application for EA taking 300 days it will now be completed in 147 days.

REDZs[20] *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.*

Cabinet further stated that the REDZs will, among others, accelerate infrastructure development and contribute in creating a "predictable regulatory framework that reduces bureaucracy related to the cost of compliance".

The DEA media statement issued in respect of the approved gazetting of the REDZs provided that eight REDZs and five Power Corridors have been identified. The gazetting of these areas means that projects within these areas will now only be subject to a Basic Assessment and not a full EIA process. This change will accelerate the assessment process, as scoping level pre-assessments would have been undertaken. As such an application for an EA should be completed in 147 days, instead of 300 days.

Currently one of the greatest challenges of South African renewable energy development is constraints on grid infrastructure, and the resulting timelines for and costs of grid expansion. The REDZs are anticipated to aid the future bidding rounds of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) by allowing for focused grid development and an alignment of approval processes in the REDZs. To date the REIPPPP has led to the procurement of 7000MW of renewable capacity across 92 projects.

[20] *Information sourced from: https://www.cliffedekkerhofmeyr.com/en/news/publications/2016/projects/projects-and-infrastructure-alert-25-february-renewable-energy-development-zones.html*

The eight Phase 1 REDZs were gazetted on 16 February 2018 (No. 41445, Notice 114, page 92-96) stating the following:

1. *The SEA for Wind and Solar Photovoltaic Energy in South Africa, 2015 has identified eight REDZs that are of strategic importance for large scale wind and solar photovoltaic energy development, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 8: Green Enemy in Support of the South African Economy.*
2. *On 17 February 2016, Cabinet approved, amongst others, the REDZs contained in this Notice, which are of strategic importance for large scale wind and/or solar photovoltaic energy development and an integrated decision-making process for applications for environmental authorisation in terms of NEMA.*
3. *Applications for EA for large scale wind or solar photovoltaic energy facilities, such facilities trigger activity I of EIA Regulations Listing Notice 2 of 2014 (as amended) and any other fisted and specified activities necessary for the realisation of such facilities, and where the entire proposed facility is to occur in such REDZs, must follow the basic assessment procedure contemplated in Regulation 19 and 20 of the Impact Assessment Regulations, 2014, in order to obtain EA as required in terms of the Act.*
4. *The timeframe for decision-making as contained in the EIA Regulations, 2014 (as amended) for purposes of the applications for environmental authorisation contemplated in this Notice is 57 days.*
5. *Applications for EA large scale wind or solar photovoltaic energy facilities, if being applied for outside of any REDZ, will be considered in line with the requirements as prescribed in terms of the EIA Regulations, 2014 (as amended).*
6. *If any part of the facilities contemplated in this Notice falls outside a REDZ contemplated in this Notice, the requirements as prescribed in terms of the EIA Regulations, 2014 (as amended) apply.*

7. *REDZs compiled in terms of section 24(3) of NEMA and the applicability of each REDZ for purposes of this Notice, are as follows:*

Renewable Energy Development Zone Number (Phase)	***Name***	***Applicability of REDZ***
Renewable energy development zone 1 (Phase 1)	*Overberg*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 2 (Phase 1)	*Komsberg*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 3 (Phase 1)	*Cookhouse*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 4 (Phase 1)	*Stormberg*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 5 (Phase 1)	*Kimberley*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 6 (Phase 1)	*Vryburg*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 7 (Phase 1)	*Upington*	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 8 (Phase 1)	*Springbok*	*Large scale wind and solar photovoltaic energy facilities*

The three Phase 2 REDZs were gazetted on 26 February 2021 (Gazette No. 44191, Notice 142 pg. 65-68, Notice 144 pg. 72-74 and Notice 145 pg. 75-79, page 92-96)

Renewable energy development zone 9 (Phase 2)	Emalahleni	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 10 (Phase 2)	Klerksdorp	*Large scale wind and solar photovoltaic energy facilities*
Renewable energy development zone 11 (Phase 2)	Beaufort West	*Large scale wind and solar photovoltaic energy facilities*

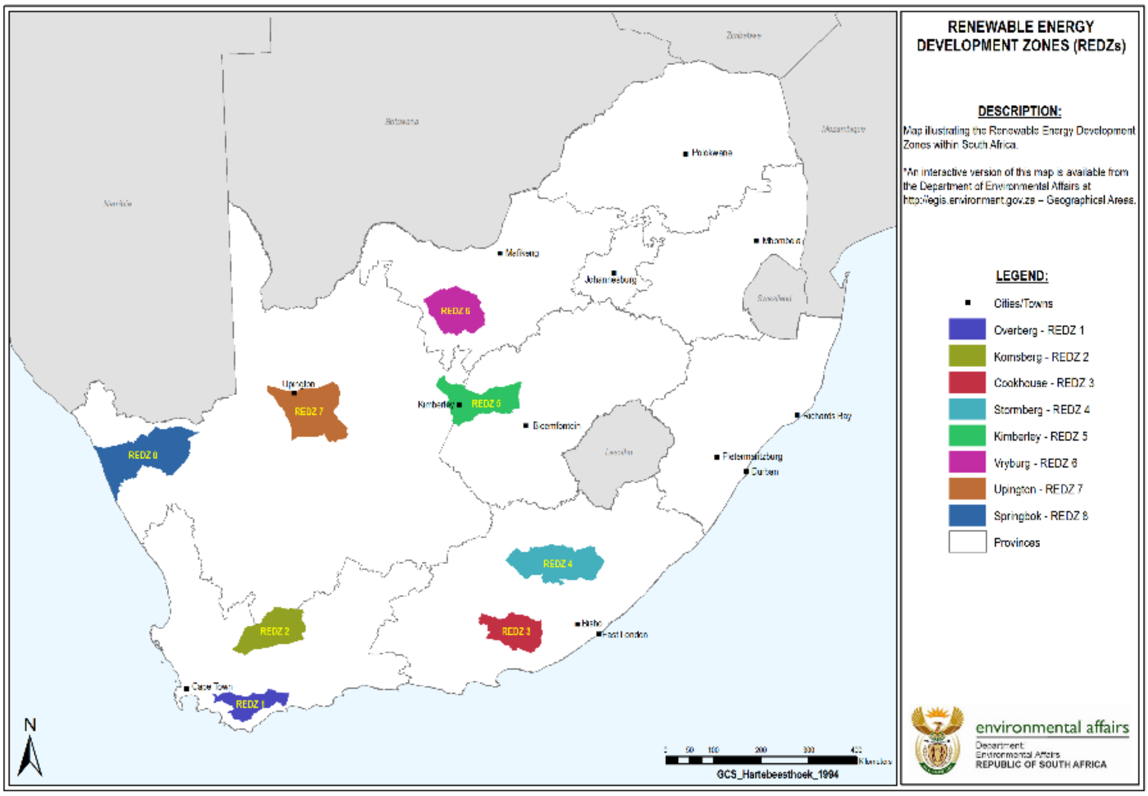


Figure 6.1: The figure above shows the Phase 1 Renewable Energy Development Zones and the Project falls inside the Overberg REDZ as gazetted February 2018.

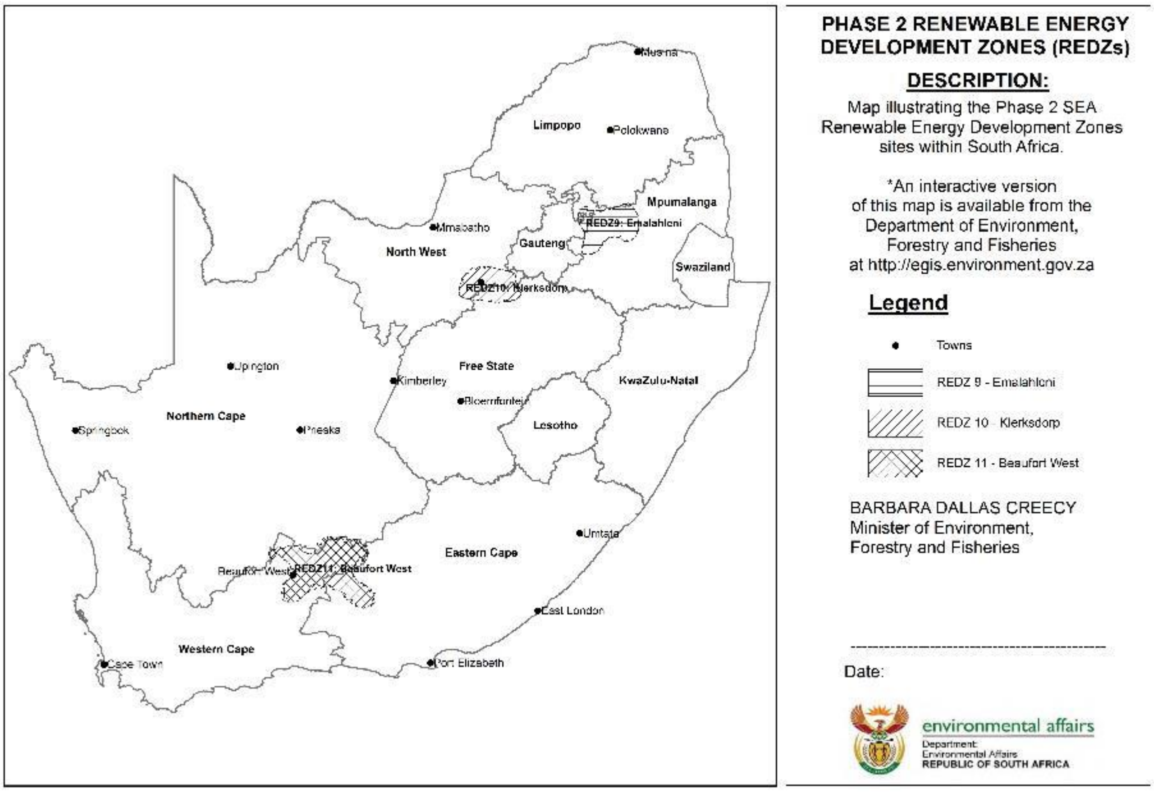


Figure 6.2: The figure above shows the Phase 2 Renewable Energy Development Zones REDZs as gazetted February 2021.

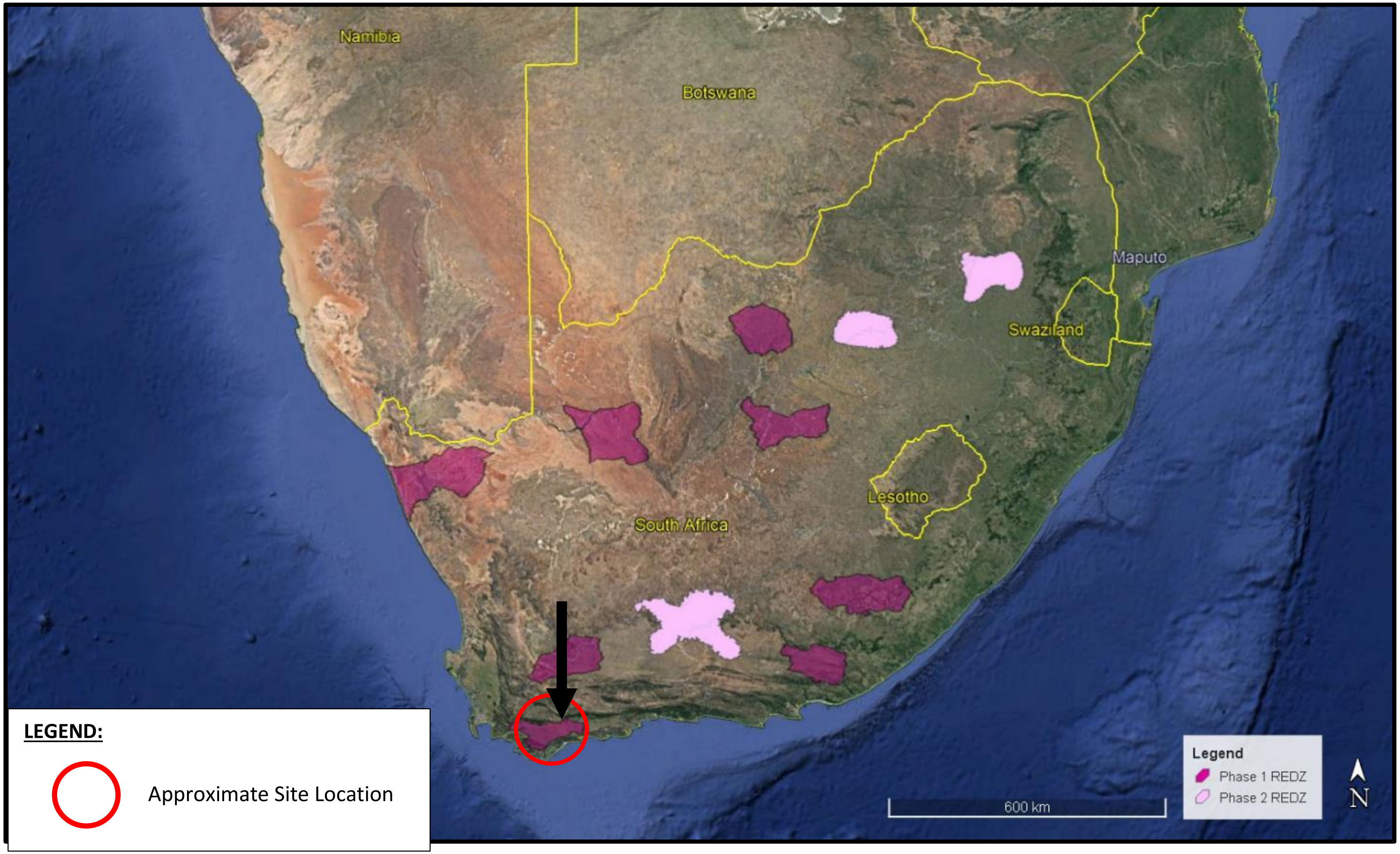


Figure 6.3: This figure shows the regional location of the Western Cape WEF relative to all Renewable Energy Development Zones (REDZ).

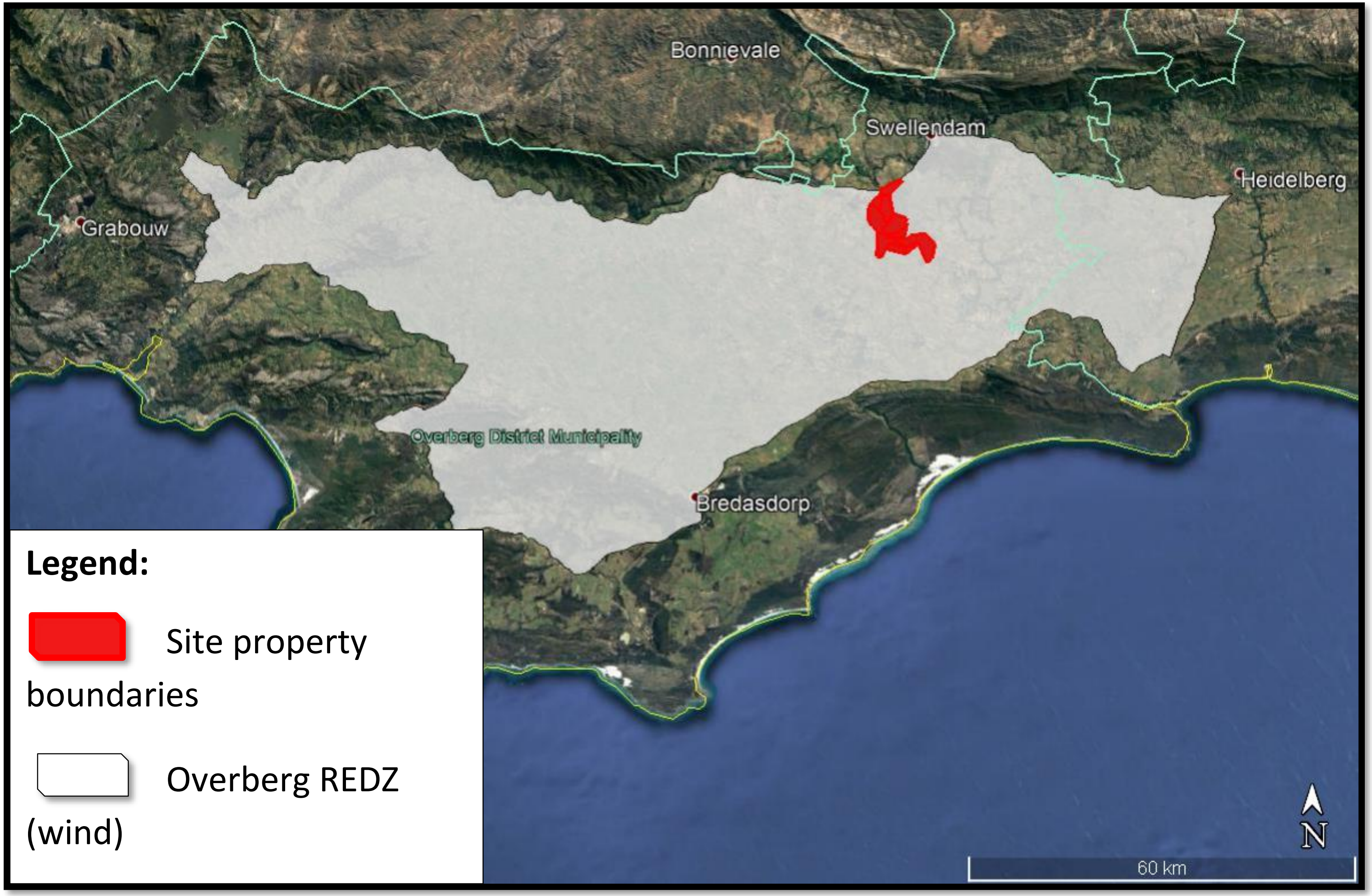


Figure 6.4: This figure shows the location of the Western Cape WEF within the Overberg REDZ, Overberg.

6.2 PROVINCIAL AND MUNICIPAL LEVEL POLICY AND PLANNING

6.2.1 Western Cape Provincial Development Plan

The Western Cape Province Spatial Development Framework (WCPSDF) makes reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Western Cape, the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensures. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display synergy with the province's natural resource endowments must be encouraged. In this regard the WCPSDF notes "Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use". The WCPSDF also highlights the importance of close co-operation between public and private sectors in order for the economic development potential of the Western Cape to be realised.

6.2.2 Overberg District Municipality Integrated Development Programme (IDP)

The Overberg IDP covers the five-year period 2017-2022. A SWOT Analysis (strengths, weaknesses, opportunities, and threats) conducted by the municipality identified solar and wind farms as potential opportunities. The proposed development is therefore in line with the IDP.

6.3 OTHER LEGISLATION AND POLICIES

Title of legislation, policy or guideline	Applicability to the project	Administering Authority	Date
NATIONAL LEVEL ENVIRONMENTAL LEGISLATION			
National Environmental Management Act (Act No. 107 of 1998)	An Application for Environmental Authorization has been submitted in terms of the NEMA EIA Regulations (2014, as amended) and the relevant provisions of these Regulations have been taken into account through the compilation of this Report and the assessment of the Application by the Independent EAP.	DEA	1998
Regulations in terms of Chapter 5 of the NEMA, 1998. (NEMA EIA Regulations 2014, as amended)	An Application for Environmental Authorization has been submitted in terms of the NEMA EIA Regulations (2014, as amended) and the relevant provisions of these Regulations have been taken into account through the compilation of this Report and the assessment of the Application by the Independent EAP.	DEA	2014 (as amended)
National Water Act (Act No. 36 of 1998)	The water use activities associated with the proposed project would fall within the ambit of the General Authorisations for Section 21(c) and (i) water uses. An application for water use authorization	BGCMA/DWS	1998

	will be made after the final BAR is submitted for decision.		
National Heritage Act (Act No. 25 of 1999)	An NID was submitted to Heritage Western Cape (HWC) and SAHRA.	SAHRA and HWC	1999
Civil Aviation Act (Act No. 13 Of 2009)	Approval from the South African Civil Aviation Authority (SACAA) and the South African Air Force (SAAF) was obtained as the Project could potentially affect the operations of the above Authorities.	SACAA and SAAF	2009
NATIONAL LEVEL ENERGY POLICY AND LEGISLATION			
National Energy Act (Act No 34 of 2008)	The proposed Project is for the establishment of an overhead powerline that will be connected to a Wind Energy Facility which is a renewable resource Project, which this Act makes direct reference to. Please refer to Section 6.3.2 below.	DoE	2008
White Paper on the Energy Policy of the Republic of South Africa	The proposed Project will facilitate the generation and use of electricity and therefore this Policy refers. Please refer to Section 6.3 below.	DoE	1998
White Paper on Renewable Energy	The proposed Project is for the establishment of an overhead powerline that will be connected to a Wind Energy Facility which is a renewable resource Project. Please refer to Section 6.3 below.	DoE	2003
National Integrated Resource Plan for Electricity (2010-2030)	The proposed Project is for the establishment of an overhead powerline that will be connected to a Wind Energy Facility, which will involve the generation and use of electricity in a sustainable manner. Please refer to Section 6.3 below.	DoE	2011
National Development Plan (NDP)	The proposed Project aims at enhancing economic growth, which the NDP is striving towards. Please refer to Section 6.3.6 below.	DEA	2013
National Infrastructure Plan	The proposed Project aims at enhancing economic growth, which the NIP is also striving towards. Please refer to Section 6.3.7 below.	DEA	2012

Title of legislation, policy or guideline	Applicability to the project	Administering Authority	Date
PROVINCIAL LEVEL POLICY AND PLANNING			
Western Cape Land Use Planning Act, 2014 (Act No. 3 of 2014)	Consent use is required from the Landowners on which the Wind Energy Facility is proposed to be established.	Provincial	2014
Environmental Impact Assessment Guideline for Renewable Energy Projects	These guidelines have been considered in order to ensure that the environmental management legal framework applicable to renewable energy operations and all the role players in the sector have been appropriately actioned.	DEA	2015
DEA&DP Guideline Document: Guideline on Public Participation, August 2013	The public participation process, summarized in Section C of this report, has been undertaken in accordance with this guideline.	DEA&DP	2013
DEA Guideline on Need and Desirability, April 2017	The approach to alternatives which has been adopted in this process is consistent with this guideline.	DEA	2017

6.4 KEY AUTHORITIES FOR THIS ENVIRONMENTAL APPLICATION

Based on a review of the applicable statutory permitting requirements, the following Authorities will form the key decision makers for the Project:

- Birdlife SA
- Cape Nature
- Overberg District Municipality
- Department of Economic Development and Tourism
- Department of Forestry, Fisheries and the Environment (DFFE)
- Department of Local Government & Housing: Provincial Disaster Management Centre
- Department of Water & Sanitation (DWS)
- Dept of Agriculture, Forestry and Fisheries
- ESKOM
- Heritage Western Cape
- National Energy Regulator of South Africa (NERSA)
- SANPARKS
- SANRAL
- South African Civil Aviation Authority (CAA)
- South African Heritage Resource Agency (SAHRA)
- Telkom
- Breede-Gouritz Catchment Management Agency
- Western Cape Department of Agriculture
- Western Cape Department of Environmental Affairs & Development Planning (DEA&DP)
- Western Cape Department of Transport
- Wildlife and Environment Society of South Africa (WESSA)
- Swellendam Local Municipality

6.5 INTERNATIONAL STANDARDS

6.5.1 International Finance Corporation Performance Standards

The Applicant is committed to complying with the International Finance Corporation (IFC) Performance Standards (PS) on social and environmental sustainability. These were developed by the IFC and were last updated on 1st January 2012.

The overall objectives of the IFC PS are:

- To fight poverty;
- To do no harm to people or the environment;
- To fight climate change by promoting low carbon development;
- To respect human rights;
- To promote gender equity;
- To provide information prior to project development, free of charge and free of external manipulation;
- To collaborate with the project developer to achieve the PS;
- To provide advisory services; and
- To notify countries of any Transboundary impacts as a result of a Project.

The PS comprise of eight performance standards, namely:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and
- Impacts;
- Performance Standard 2: Labour and Working Conditions;
- Performance Standard 3: Resource Efficiency and Pollution Prevention;
- Performance Standard 4: Community Health, Safety and Security;
- Performance Standard 5: Land Acquisition and Involuntary Resettlement;
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- Performance Standard 7: Indigenous Peoples; and
- Performance Standard 8: Cultural Heritage.

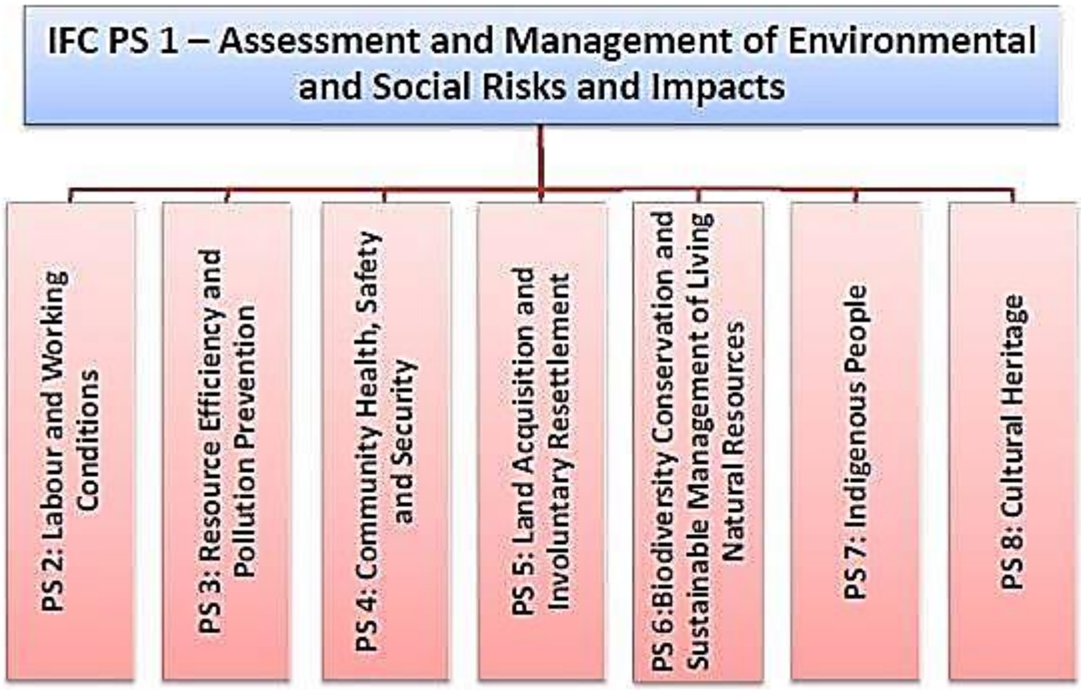


Figure 6.6: This Figure shows the PS Framework as extracted from the IFC PSs

The PS framework is presented above.

PS 1 establishes the importance of:

i. integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects;
ii. effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
iii. the management of social and environmental performance throughout the life of a project through an effective Environmental and Social Management System (ESMS).

PS 1 is the overarching standard to which all the other standards relate. The ESMS should be designed to incorporate the aspects of PS 2 to 8 as applicable.

PS 2 through to 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, PS 2 through 8 describe potential social and environmental impacts that require particular attention in emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with PS 1.

6.5.2 Equator Principles

The Equator Principles (EPs) is a credit risk management framework for determining, assessing and managing environmental and social risk in Project Finance transactions. Project Finance is often used to fund the development and construction of major infrastructure and industrial projects. The EPs are adopted by financial institutions and are applied where total project capital costs exceed US$10 million. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs are based on the IFC PS 2012 and on the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).

The Equator Principles Financial Institutions (EPFIs) have consequently adopted these Principles in order to ensure that the projects they finance are developed in a manner that is socially responsible and reflect sound environmental management practices.

EPFIs will only provide loans to projects that conform to the following principles:

- Principle 1: Review and Categorisation;
- Principle 2: Social and Environmental Assessment;
- Principle 3: Applicable Social and Environmental Standards;
- Principle 4: Action plan and Management;
- Principle 5: Consultation and Disclosure;
- Principle 6: Grievance Mechanism;
- Principle 7: Independent review;
- Principle 8: Covenants;
- Principle 9: Independent Monitoring and Reporting; and
- Principle 10: EPFI Reporting

6.5.3 The World Bank Group Environmental Health and Safety (EHS) Guidelines

The EHS Guidelines (World Bank Group, 2007) are technical reference documents with general and industry specific (i.e. mining) examples of Good International Industry Practice (GIIP). Reference to the EHS guidelines is required under IFC PS 3.

The EHS Guidelines contain the performance levels and measures normally acceptable to the IFC and are generally considered to be achievable in new facilities at reasonable cost. When host country regulations differ from the levels and measures presented in the EHS Guidelines, Projects are expected to achieve whichever standard is more stringent.

This BAR is broadly aligned with the various Standards discussed above.

7 MOTIVATION FOR NEED AND DESIRABILITY FOR THE PROPOSED ACTIVITY

In accordance with ***Appendix 1 Regulation 3(f) of GN No. R.326 of the NEMA EIA Regulations (2014, as amended)****: the following information is presented in Section 6*

- *A motivation for the need and desirability for the proposed development including the need and desirability of the activity in context of the preferred location.*

This section outlines the purpose of considering the activity "need" and "desirability" in accordance with the National Environmental Management Principles in terms of NEMA which serve as a guide for the interpretation, administration and implementation of NEMA and the NEMA EIA regulations (2014, as amended).

7.1 LEGISLATIVE FRAMEWORK

The National Environmental Management Principles specifically require, *inter alia,* the following:

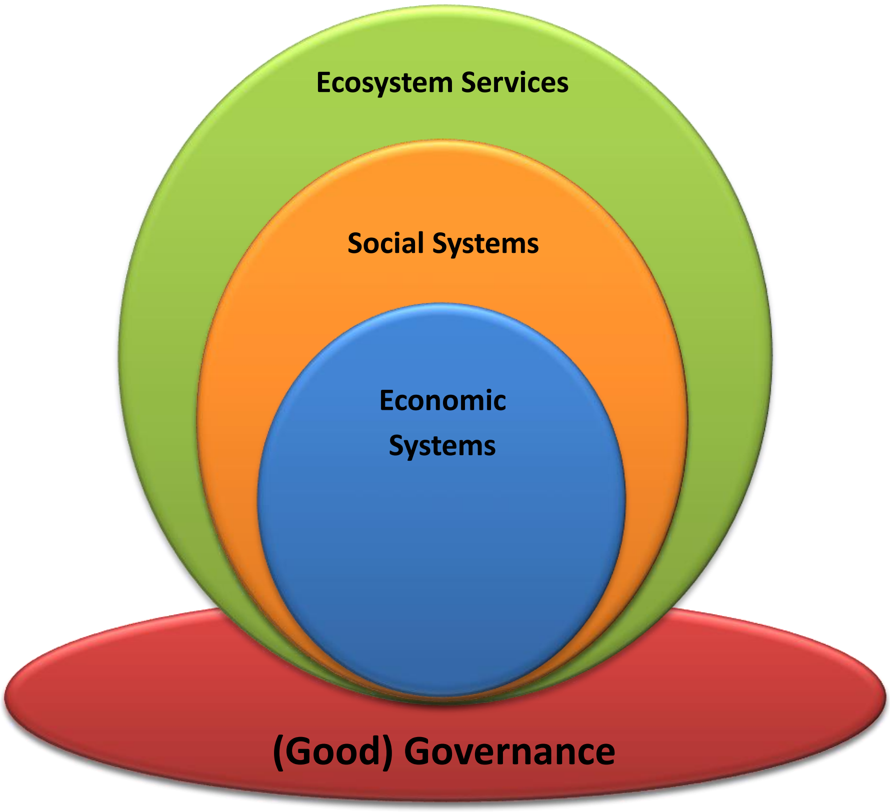
- *"Environmental Management must place people and their needs at the forefront of its concern and equitably serve their interests;*
- *"Environmental Management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option;*
- *"Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person; and*
- *"Decisions must take into account the interests, needs and values of all interested and affected parties;*
- *"The Environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage."*

Need and Desirability must thus be considered in the context of **sustainable development** which is underpinned by social, economic and environmental considerations and takes a long-term strategic view to environmental management.

7.2 SUSTAINABLE DEVELOPMENT

Sustainable development is best summarised by an extract from the United Nations World Commission on Environment and Development (WCED) and reads as follows:

"*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs… As such it requires the promotion of values that encourage consumption standards that are within the bounds of the ecologically possible and to which all could reasonably aspire.*" (Our Common Future, WCED, 1987).[21]



The widely accepted inter-dependence model of sustainability recognises that social and economic systems **have never been and can never be independent of the natural system**.

This model further supports the belief that **interactions** between and within component systems will result in **feedback** throughout the system.

Endorsed by the National DEA

(Mebratu, 1998)

It is thus important that the BAR carefully considers and assesses the broad principles of sustainable development in order to clearly demonstrate the need and desirability of the proposed activity in the context of NEMA.

[21] *United Nations. 1987. "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187, 11 December 1987*

7.3 WESTERN CAPE WEF NEED AND DESIRABILITY

7.3.1 National Need and Desirability

The National Development Plan (NDP) (see section 5.1.9) recognises that the South African economy is "electricity intensive" and is in need of greater power generation capacity in order to avoid energy crises such as the one experienced in 2008 and to ensure long-term economic growth and development. It therefore promotes the development of additional energy facilities to ensure that sufficient electricity is supplied to the national grid to meet the country's demand.

Coupled with the need for a greater energy supply is the exigency to rely on cleaner energy resources. Eskom's *Coal Report* makes the following observation: "Air pollution caused by Eskom's coal power stations in two provinces is killing at least 20 people a year and could jump to 617, with 25 000 people hospitalised, once all its stations are up and running. These would include the giant Medupi and Kusile power stations in Mpumalanga and Limpopo."[22]

In an increasingly carbon constrained world already facing climate change impacts, South Africa has to reduce greenhouse gas emission intensity decidedly and soon.[23] To this end, managing the transition towards a low carbon national economy is identified as one of the nine key national challenges in the NDP. Furthermore, with imminent carbon fines and ever decreasing coal reserves, the economic risk of relying on fossil fuels continues to rise. Investment in renewable energy and energy efficiency is therefore paramount in reducing the negative economic, social and environmental impacts of energy production and consumption in South Africa.[24]

Readily available renewable energy sources are thus a viable solution to reconcile essential economic development with the need to keep carbon emissions in check.[25] Wind as an energy source is only practical in areas that have strong and steady winds. The Western Cape WEF indicated suitability and high wind energy potential of the area.

Essential to improving the country's electricity supply is improved access to renewable sources of energy. The NDP identifies the need for South Africa to invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The NDP prioritises 'improvements to infrastructure' to ensure increased access to electricity and a 'transition to a low-carbon economy.' A critical component is energy infrastructure, which underpins all economic activity and facilitates growth. The NDP requires the development of 10,000 MWs of additional electricity capacity by 2025.

In conclusion, the construction of the proposed Western Cape WEF contributes to South Africa's overarching goal of sustainable development through promoting a greener economy, improving access to critical resources and developing a greater network of essential infrastructure in places where it is most needed.

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[22] *http://mg.co.za/article/2014-06-19-power-stations-are-deadly-internal-report-reveals*
http://www.iol.co.za/business/companies/eskom-pollution-is-now-major-issue-1.1814603
http://earthlife.org.za/2015/02/joint-media-release-another-five-years-of-toxic-pollution-by-eskom/
http://www.news24.com/Green/News/Eskom-coal-is-a-killer-new-study-says-20140702
[23] Pegels, A (2010) *Renewable Energy in South Africa: Potentials, barriers and options for support*
[24] Winkler, H (2005) *Renewable Energy Policy in South Africa: Policy options for renewable electricity*
[25] Deichamnn et al. (2011) *The economics of renewable energy expansion in rural Sub-Saharan Africa*

7.3.2 Regional Need and Desirability Motivation

The Western Cape WEF is located within a REDZ and is located in a region earmarked for renewable energy development.

The Western Cape Province Spatial Development Framework (WCPSDF) makes reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Western Cape, the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensures. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display synergy with the province's natural resource endowments must be encouraged. In this regard the WCPSDF notes "Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use". The WCPSDF also highlights the importance of close co-operation between public and private sectors in order for the economic development potential of the Western Cape to be realised.

7.3.3 Motivation for the Proposed Western Cape WEF

The renewable energy sector has been tasked with supplying a full 42% of South Africa's energy by the year 2030 – and wind farms are set to play a critical role in meeting this target. The PDP recognises that the currently approved wind energy facilities are not enough to meet the region's demand and therefore promotes the development and construction of more wind energy facilities. With projects in the pipeline such as the Western Cape WEF, the Western Cape is set to contribute to this target in a meaningful way. The cumulative impacts of the Western Cape WEF will not be unacceptable as there is still a need for more wind energy facilities in the region as recognised in the provincial policies and plans. Furthemore, the site has specifically been selected to maximise socio-economic potential in the region in the form of job creation and energy supply where it is most needed. The site has also been assessed by a number of independent experts to ensure that all environmental and social concerns are kept to a minimum and appropriately mitigated.

7.4 GUIDELINES ON NEED AND DESIRABILITY

This BAR has carefully considered and applied the *DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa*.

Based on the information presented within this guideline, we believe that the proposed Western Cape WEF are aligned with the requirements of the Guidelines. Need and desirability relates to the nature, scale and location of the development being proposed, as well as wise use of land. The definitions of need and desirability refer to time and place respectively and should be considered holistically.

Importantly, the Guidelines recognise the importance of considering “the status of our ecosystem services” when pursuing economic development. To this end, the development has been informed by the assessments of the Professional Team and are summarised in Sections 8 and 12 in this Report. The Professional Team’s assessments and the EAPs overall opinion is that the proposed Western Cape WEF will secure ecological sustainable development and use of natural resources and will not adversely affect the receiving environment if the recommended mitigation measures are implemented.

Further, based on the Professional Team’s assessments and providing that the Applicant adheres to all the mitigation measures prescribed by the Professional Team, the proposed overhead powerline will promote justifiable economic and social development.

NEED AND DESIRABILITY CHECKLIST

Please refer to the questions below based on the Need and Desirability Guidelines, which demonstrate that the proposed development is underpinned by the principles therein and consistent with the relevant policies and strategies.

7.4.1 Need ('Timing')

Need and desirability	
Need (''timing'')	
Question	**Response**
1. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the Projects and Programmes identified as priorities within the credible IDP).	Yes, the proposed Western Cape WEF is in line with the WCPSDF and the Overberg IDP.
2. Should the development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occurs here at this point in time?	Yes, the proposed Western Cape WEF will add an additional 140MW of generating capacity to the national grid.
3. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This referred to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate).	The community is specifically in need of renewable energy activities like this project as the local area will benefit from this activity through job creation and increased access to electricity. This is a national priority for the national and local need (See section 7.3 and 7.4).
4. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Based on the available information, it is evident that all necessary services with adequate capacity are currently available and no additional capacity is required.
5. Is the development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	The proposed Western Cape WEF will not have a significant impact on the infrastructure planning of the municipality. The purpose of the project is to provide renewable electricity and therefore connecting to the closest electrical power station forms part of the entire application.
6. Is the project part of a national programme to address an issue of national concern or importance?	Yes. The purpose of the project is to provide renewable electricity.

7.4.2 Desirability ('Placing')

Need and desirability	
Desirability (''placing'')	
Question	**Response**
1. Is the development the best practicable environmental option for this land/site?	Yes, the Western Cape WEF is located within a REDZ. The project site is located in an area where there is high wind resource availability for renewable energy generation.
2. Would the approval of this application compromise the integrity of the existing approved and credible municipal IPD and SDF as agreed to by the relevant authorities?	No. The Western Cape and aligns with the Overberg IDPs which recognises the need for renewable energy.
3. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in the EMFs), and if so, can it be justified in terms of sustainability considerations?	No. The Western Cape WEF is located within a REDZ. Furthermore, if all recommendations are followed from the relevant Authorities and Professional Team, then it can be justified that all environmental management priorities were considered.
4. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its boarder context).	Yes. The Western Cape WEF is located within a REDZ. Furthermore, if all recommendations are followed from the relevant Authorities and Professional Team, then it can be justified that all environmental management priorities were considered.
5. How will the activity or land use associated with the activity applied for, impact on sensitive natural and cultural areas (Built and rural/natural environment)	Based on the available information, Impact Assessments undertaken by the professional team and site assessments undertaken by the EAP and the professional team, it is reasonable to suggest that the Western Cape WEF will have minimal impacts on the built and natural environment.
6. How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	Based on the available information, the Impact Assessments undertaken by the Professional Team and the site assessments undertaken the EAP and Professional Team, it is reasonable to suggest that the proposed Western Cape WEF are unlikely to have an impact on people's health and wellbeing. The turbines will have potential visual impacts in certain areas, but these will be minimised as far as possible.

7. Will the proposed activity or the land use associated with the activity applied for result in unacceptable opportunity costs?	No. Based on the available information, the Assessments undertaken by the professional team and the site assessments undertaken by the EAP and the professional team, it is reasonable to suggest that the establishment of the OHPL will not result in unacceptable opportunity costs The project also realises a national need and priority and will contribute to a greater network of efficient electrical infrastructure and increased access to electricity. .
8. Will the proposed land use result in unacceptable cumulative impacts?	Based on the available information, the assessments undertaken by the professional team and the site assessments undertaken by the EAP and the professional team, it is reasonable to suggest that minimal and mitigatable cumulative impacts are expected.

Based on the above, and the available information, it is evident, through the findings of the Professional Team and this Basic Assessment Report that the proposed development broadly meets the DEA "need and desirability" criteria, and the development proposal is therefore considered, for the purposes of this application, to be acceptable in terms of these criteria.

8 SPECIALIST STUDY FINDINGS AND SUMMARY OF ENVIRONMENTAL ATTRIBUTES

*In accordance with **Appendix 1 Regulation 3(h)(iv), (m) and (k) of GN No. R. 326 of the NEMA EIA** Regulations (2014, as amended):*

> ***3(h) (iv)** – The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;*
>
> ***3(m)** - Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;*
>
> ***3(k)** - Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;*

The following specialist assessments were undertaken for the BAR, as determined by the EAP, the Client and in consultation with the Competent Authority:

Theme	Specialist	Date of Report
Agricultural	Agri Informatics C/O Francois Knight	July 2021 (updated Aug 2021)
Avifaunal/Bird	Chris van Rooyen Consulting C/O Chris van Rooyen	August 2021
Bat	Arcus C/O Ashlin Bodasig	June 2021 (updated Aug 2021)
Botanical	Nick Helme Botanical Surveys C/O Nick Helme	July 2021
Freshwater	BlueScience C/O Antonia Belcher	July 2021
Heritage	CTS Heritage C/O Jenna Lavin	August 2021
Noise	dBAcoustics C/O Barend J B van der Merwe	July 2021
Socio-Economic	Multipurpose Business Solutions C/O Dr Jonathan Bloom	July 2021
Town Planning	Warren Petterson Planning C/O Andries Du Plessis	July 2021
Transport	Innovative Transport Solutions C/O Christoff Krogscheepers	July 2021
Visual	Environmental Planning and Design C/O Jon Marshall	August 2021

Please note all potential impacts have been summarised in this Section and a full Impact Assessment is depicted in Section 12 of this Report. Please note that all Specialist Reports and statements for this BAR are attached in Appendix D and form part of the BAR for a 30-day PPP.

8.1 AGRICULTURAL IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Agri Informatics C/O Francois Knight to undertake an Agricultural Impact Assessment for the proposed Western Cape WEF.

8.1.1 Receiving Environment and Agricultural Sensitivity

The study area is situated in the "Rûens" homogenous farming area (HFA) of the Overberg, as defined by the Provincial Department of Agriculture.

Where the soils and slopes permit, the natural vegetation (Eastern Rûens Shale Renosterveld, Mucina *et al, 2018)* has been removed to make way for dry land small grain production, leading to a landscape almost fully converted to agriculture. The main agricultural activity in the Rûens is small grain (wheat and barley) and dryland lucerne production in combination with sheep farming. Here, a three-year rotation system of wheat, a fodder crop and fallow are mostly followed, leading to ±30% of the land being used for cash crop production in any year.

The land portions of the study area have no access to irrigation water from any local source, i.e. groundwater or surface water. There is also no water available from any irrigation scheme. The possibility to obtain water in future is also deemed highly unlikely. […] The production of a cash crop is […] limited to the cool winter rainy season.

In terms of the Land Capability classification, most of the study area has been mapped as *Class 7* or lower, with only small sections at *Class 8 or 9* (Figure 8.1). The footprint of the Wind Energy Facility, including all infrastructure, roads and trenches, is situated in *Class 7* or lower. This implies that the sensitivity of the land is **Low outside of field crop boundaries, but High when placed inside field crop boundaries.**

The marginal winter rainfall (235 mm), dry summers and non-availability of irrigation water, limits the agricultural potential of the study area. Winter cereal crops and lucerne grown as fodder or grazing, in combination with a livestock component – mainly sheep – are the only practical farming system for the area. Wheat (and fodder) yields are moderate due to sub-optimal rainfall in average rainfall years, whilst crop failures can be expected in some dry years. **The overall agricultural potential of the study area is therefore evaluated as being moderate.**

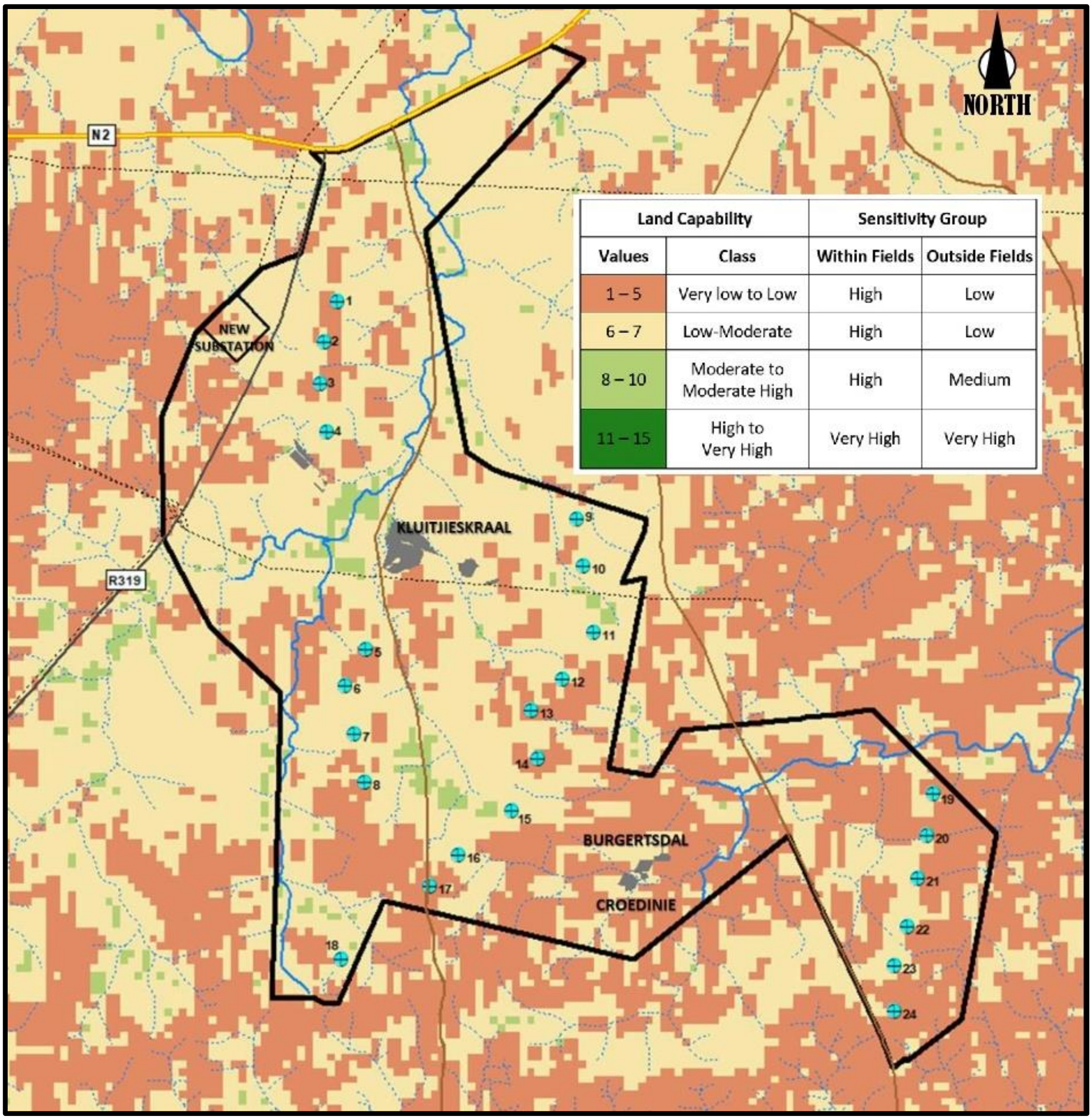


Figure 8.1: This figure shows the agricultural land capability.

8.1.2 Potential Impact Identified

Globally there are many examples of wind farms on agricultural land with minimal, if any impact on the agricultural production of the land. In most cases it can be assumed that the revenue earned through lease agreements are used in support of the farming enterprise and therefore contributing to the viability of the farm. The construction of a wind energy facility on farmland also provides an opportunity for the upgrading of farm roads and water runoff infrastructure. However, poor planning, design and installation can induce unacceptable impacts on the natural resources, production and ultimately on food security

The infrastructure of a wind energy facility, namely the wind turbines, hard set areas, access roads, cable trenches, overhead power lines for grid connection, the control room, site construction office, lay down areas and/or spoil stock piling areas may have a temporary (during construction), long term (during operation) or permanent (concrete structures remaining after decommissioning) impact on the natural resource base to the disposal of agricultural production, through:

- Occupation of land that has a high potential for future production
- Interference with natural or artificial drainage lines or structures (contour banks & waterways)
- Inducing additional runoff from hard set areas or access roads
- Erosion (wind and water) due to increased runoff and/or removal of vegetation cover
- Disturbance to the soil (i.e. for temporary roads or cable trenches) with inappropriate reclamation afterwards
- Deterioration of grazing capacity
- Occupation of productive agricultural land by the turbine, hard standing area, access roads, other infrastructure and storage area for spoil/topsoil
- Complicating workability of or access to some cultivated fields
- Complicating or preventing the use of aircraft for crop spraying

The proposed Western Cape wind energy facility will occupy a combined area of 46.9 ha on a total farm area of 4 989 ha (0.94%). The total footprint within cultivated fields is 23.4 ha of 4 200 ha (0.56%) of fields of generally medium potential for dryland cultivation. Provided that all mitigation measures are carefully applied, the impact on agricultural activities will be low (See Figure 8.2) and normal agricultural use should be possible for the duration of the operation of the WEF and after decommissioning.

The main impact will be during construction when grazing on certain fields will have to be scheduled to accommodate the construction process. Access to certain fields may also be restricted during construction, but with good planning and co-ordination, most cultivation should also be possible during construction.

Possible benefits to agriculture from the wind energy facility, apart from the projected revenue stream to the lessor of the land, include:

- Upgrading and protecting of eroded drainage lines
- Upgrading of certain farm roads (access roads)
- Enhanced farm security and access control.

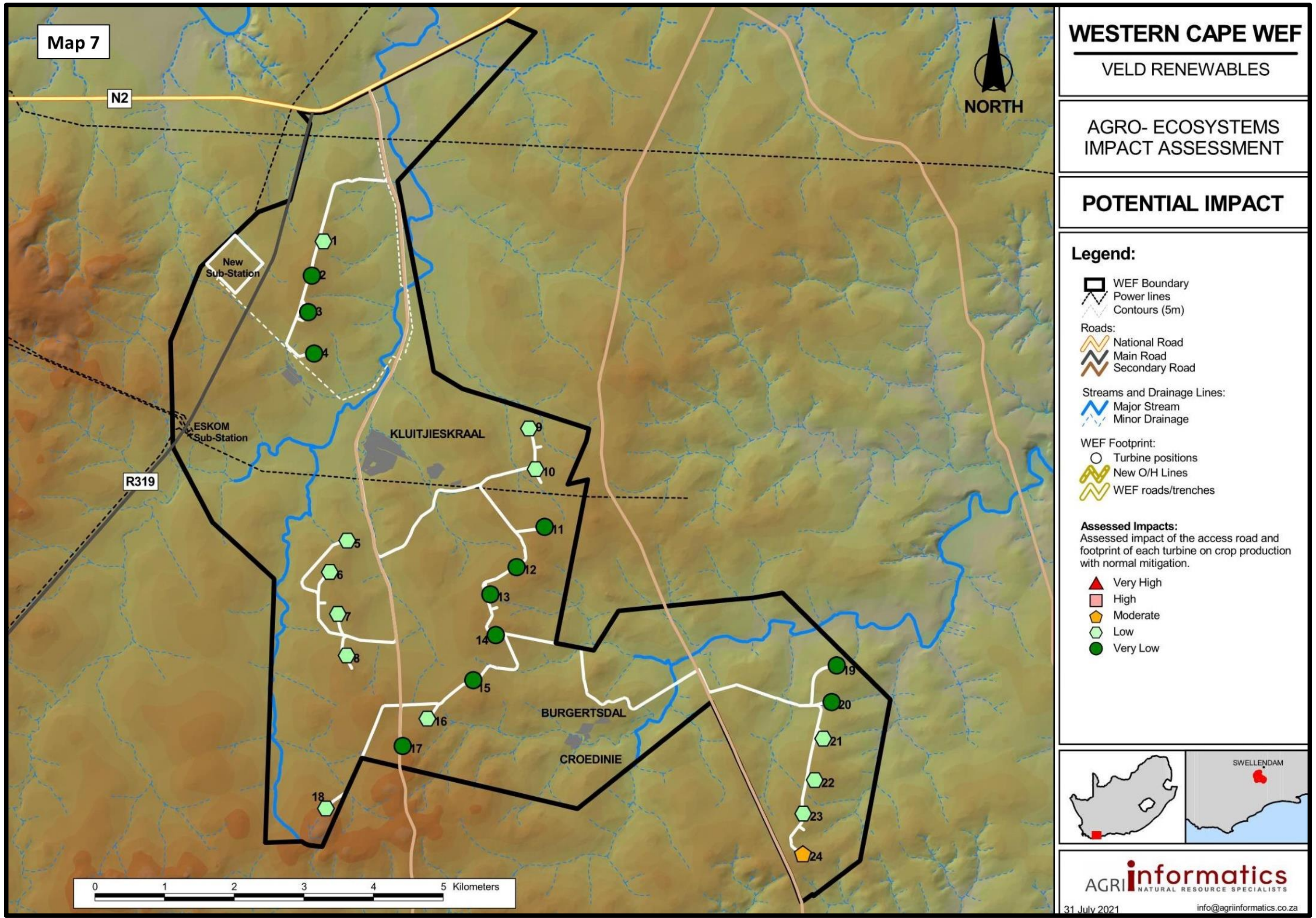


Figure 8.2: This figure shows the potential agricultural impacts of the turbines and access roads for the proposed Western Cape WEF.

Mitigation measures

<u>DAFF prescribed mitigation measures</u>

The following mitigation measures, applicable to the Western Cape WEF is prescribed by the DAFF regulations for renewable energy facilities on agricultural land:

- Every care should be taken before, during and after the construction and future maintenance of the renewable energy structure, supporting infrastructure or access routes to protect the vegetation and veld condition against deterioration and destruction.
- It is the responsibility of the owner of the renewable energy project to ensure that suitable soil conservation works be established on the site to limit or restrict the loss of soil.
- No renewable energy structure, supporting infrastructure or access routes shall in any manner divert any run-off water from a water course to any other water course or obstruct the natural flow pattern of runoff water, except with the permission from DAFF.
- All access routes, existing or newly constructed and utilized during the construction and / or maintenance of the renewable energy structures should be restored to its original state after completion of the establishment of the structures. Ever care should be taken not to damage or degrade the status of the natural resources base of the farm during the construction phase of the mentioned or to impact negatively on the farming or production practices on the farm.
- All service routes that will be used to gain access to the renewable energy structures for maintenance purposes have to be covered in gravel, tarred or compressed in order to limit the possibility of degradation and erosion.
- The installation of the underground power cables should not negatively impact on the resource base of the site. During the installation no soil conservation structure should be disturbed, the soil texture should be restored, the work area should not be wider than 5 m, should not be directed through existing or future cultivated land nor impact negatively on existing farming infrastructure or any farming activity.
- The lease agreement should be transferred to the new landowner, should the farmer decide to sell the property during the time period of the current lease agreement. DAFF needs to be informed of the transfer of the lease agreement upon which a new approval number will be issued. Supporting documentation should be provided that the new landowner concurs with the specifications of the existing lease agreement.

<u>Site specific mitigation measures</u>

The results of this agro-ecological assessment were used by the design team of the Western Cape WEF and resulted in the implementation of mitigation measures during the design phase already. This entailed both the placement of the turbines and the delineation of access roads. The following additional mitigation measures are recommended specifically for the Western Cape WEF:

- Careful micro-siting can reduce the impact of all turbines.
- Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road, as indicated by the green line.

- All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas.
- Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning.
- Subsoil can be used – if suitable – for road construction.
- The establishment of a ground cover (vegetation) on disturbed.
- land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested.
- The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.

8.1.3 Conclusion

Provided that all mitigation measures are carefully applied, the impact on agricultural activities will be **Low to Very Low** and normal agricultural use should be possible for the duration of the operation of the WEF and after decommissioning. Furthermore the proposed WEF development presents many possible benefits from an agricultural perspective, both financially and with regards to agricultural infrastructure. Therefore, from an agricultural perspective, the proposed development considered can proceed, provided that all mitigation measures are adhered to.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from an **agricultural** perspective, **provided all mitigation measures are adhered to.**

8.2 AVIFAUNAL IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Chris van Rooyen Consulting C/O Chris van Rooyen to undertake an Avifaunal Impact Assessments for the proposed Western Cape WEF.

8.2.1 Receiving Environment

The project site is located in the Overberg Wheatbelt IBA SA115. The landscape consists primarily of cereal croplands and artificial pastures (lucerne), with more than 95% of the natural vegetation having been transformed to agriculture. The remnants of natural vegetation are mainly Renosterveld, although they include patches of Lowland Fynbos. This vegetation and the different Renosterveld types are considered Critically Endangered due to the high degree of transformation to agriculture. Historically, this entire IBA would have comprised Renosterveld vegetation; now most of this has been lost. The 'man-made' habitats include wheat-fields and other agricultural landscapes, which do provide habitat for certain IBA trigger species, notably the threatened Blue Crane (Marnewick *et al*. 2015).

Priority species which are also IBA trigger species are the following:

- Cape Vulture
- Black Harrier
- Blue Crane
- Denham's' Bustard
- Secretarybird
- Southern Black Korhaan
- Black Stork
- Lanner Falcon
- African Grass Owl
- Karoo Korhaan
- Agulhas Long-billed Lark

The De Hoop Nature Reserve is situated between 25 and 30km south of the project site. Of importance for the proposed development is the presence of the only remaining colony of breeding Cape Vultures *Gyps coprotheres* in the Western Cape on a cliff on Potberg. The Potberg vulture colony is situated approximately 26km from the centre of the project site. The 12-months pre-construction monitoring which was conducted at the project site revealed the virtual absence of any Cape Vulture flight activity at the site, with close to zero flight activity recorded during six surveys. The absence of Cape Vulture flight activity is ascribed to the very low presence of livestock at the project site, where the main agricultural activity is cereal crop farming

The closest protected area to the project site is the Bontebok National Park which is located approximately 11km to the north-east of the site at its closest border. The avifauna in this protected area is not expected to be impacted directly by the proposed development due to the distance from the project site.

The De Hoop Nature Reserve (discussed above) is a formally protected Western Cape

Provincial Nature Reserve.

It is estimated that a total of 191 bird species could potentially occur in the broader area. Please refer to the specialist report for the comprehensive list of all the species in the broader area. Of these, 28 species are classified as priority species.

Avifaunal Sensitivity

The proposed Western Cape WEF will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species i.e., mostly bustards such as Karoo Korhaan, Denhams's Bustard, and Blue Crane, although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., raptors and storks are most at risk of all the priority species regularly occurring at the project site. Cape Vultures are also at risk, although they are likely to occur only sporadically. An avifaunal sensitivity map (buffer zones) is given in Figure 8.3.

8.2.2 Potential Impacts Identified

The proposed Western Cape WEF and associated grid connection will have several potential impacts on priority avifauna. These impacts are the following:

- Displacement of priority species due to disturbance linked to construction activities in the construction phase.
- Displacement due to habitat transformation in the construction phase.
- Collision mortality caused by the wind turbines in the operational phase.
- Electrocution in the onsite substation in the operation phase.
- Electrocution on the 132kV MV grid connection in the operational phase.
- Collisions with the 132kV grid connection in the operational phase.
- Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase

Displacement due to disturbance and habitat transformation

It is inevitable that a measure of displacement will take place for all priority species during the construction phase, due to the disturbance factor associated with the construction activities. This is likely to affect ground nesting species the most, as this could temporarily disrupt their reproductive cycle. Species which fall in this category are Blue Crane, Karoo Korhaan, Southern Black Korhaan, Agulhas Long-billed Lark and Denham's Bustard. Some raptors might also be affected, e.g., Spotted Eagle Owl and Jackal Buzzard which could potentially breed in the stands of Eucalyptus on the site. Some species might be able to recolonise the area after the completion of the construction phase, but for some species this might only be partially the case, resulting in lower densities than before once the WEF is operational, due to the disturbance factor of the operational turbines.

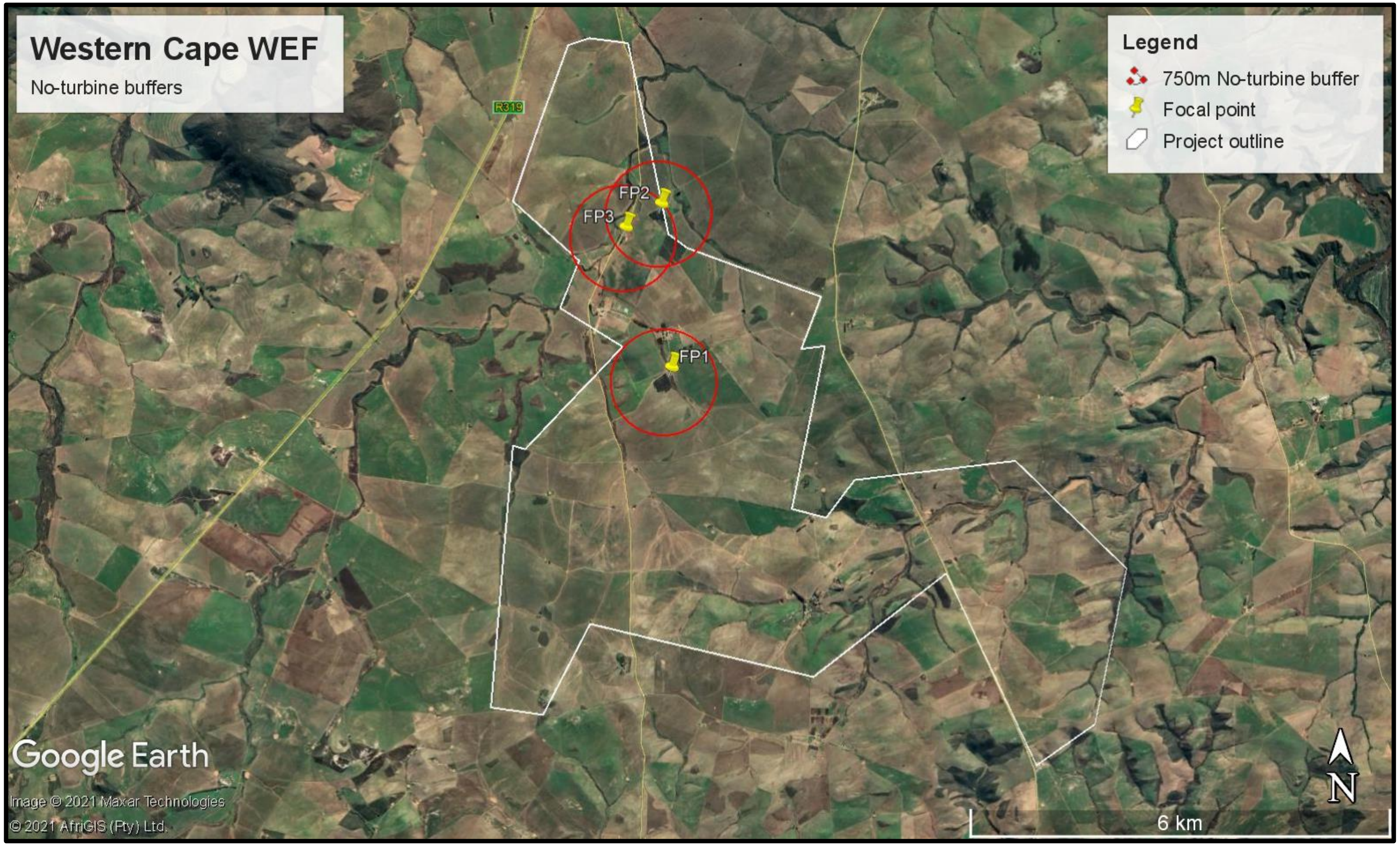


Figure 8.3: Avifaunal sensitivity map of the Western Cape WEF Site, indicating the 750m buffer zones around a number of alien tree stands, which could attract priority avifaunal species.

The network of roads is likely to result in significant habitat fragmentation, and it could have an effect on the density of several species, particularly larger terrestrial species such as Denham's Bustard, Blue Crane, Secretarybird, White Stork and Karoo Korhaan, but less so for smaller species such as Agulhas Long-billed Lark. Given the current density of the proposed turbine layout and associated road infra-structure, it is not expected that any priority species will be permanently displaced from the development site. The alternative substation locations are all situated in essentially the same habitat, i.e., agricultural crops. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. The same goes for the alternative BESS areas.

Mortality due to turbine collisions

The proposed Western Cape WEF will pose a collision risk to several priority species which could occur regularly at the site. Species exposed to this risk are large terrestrial species i.e., mostly bustards such as Karoo Korhaan, Denhams's Bustard, and Blue Crane, although bustards and cranes generally seem to be not as vulnerable to turbine collisions as was originally anticipated (Ralston-Paton & Camagu 2019). Soaring priority species, i.e., raptors and storks are most at risk of all the priority species regularly occurring at the project site, including Jackal Buzzard, Booted Eagle, Spotted Eagle-Owl, Common Buzzard and Lesser Kestrel. Cape Vultures are also at risk, although they are likely to occur only sporadically.

Electrocution on the onsite substation and the 132kV grid connection (OHPL)

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2000). The electrocution risk is largely determined by the design of the electrical hardware.

There is a potential risk of electrocution for certain priority species in the onsite substation, particularly raptors, although it is likely to be rare occurrence, and should not affect the larger Red Data species, as they are not likely to frequent the substation.

The only priority species which is potentially at risk of electrocution on the proposed 132kV grid connection is the Cape Vulture, due to its large size.

Collisions with the 132kV grid connection

The priority species which are most vulnerable to protentional collision mortality on the 132kV impact are Blue Crane, Denham's Bustard, Karoo Korhaan, Secretarybird, White Stork and to a lesser extent Cape Vultures.

Cumulative impacts – Western Cape WEF

The maximum likely number of wind turbines which are currently proposed for the wind farms which are located within a 30km radius in similar habitat around the project site is approximately 59. Of these, 13 have been constructed to date at Excelsior Wind Farm, and each of the planned projects must still be subject to a competitive bidding process where only the most competitive projects will obtain a power purchase agreement required for the project to proceed to construction. It is therefore unlikely that a total of 59 turbines will actually be constructed, but due to the possibility that it could happen, the precautionary principle must be applied, and it must be assumed that it will be the case. The 24 planned turbines of Western Cape WEF constitute 40% of the total number of planned turbines. As such, its contribution to the total number of turbines, and by implication the cumulative impact of all the planned turbines, is relatively high. However, the currently planned density of turbines within the 30km radius around the project site amounts to 1 turbine/47km², which is still a low density of turbines. The cumulative impact of all the planned turbines on priority species within the 30km radius is therefore still relatively low. It should also be noted that the Excelsior Wind Farm has implemented a full time Shutdown on Demand (SDoD) programme on all the turbines, which further reduces the potential cumulative impact.

The cumulative impact of the proposed Western Cape WEF development should therefore not result in any unacceptable loss or impact considering all the projects currently authorised in within a 30km radius around the project site, provided the mitigation measures recommended in this report is strictly implemented.

Cumulative impacts – OHPLs

The renewable energy projects that were within a 30km radius of the proposed development were considered. Of the two, Excelsior Wind Farm is already operational. Both these projects require overhead grid connections, but information on the length of the proposed Vryheid Wind Farm grid connection could not be attained, therefore assumptions were made on the expected length, based on the distance from the Eskom grid infrastructure. Based on information obtained from Eskom, the total length of all the existing HV lines in the 30km radius amounts to an estimated 240km. The proposed Western Cape WEF will add approximately 3km to this network, which amounts to an increase of 1.25%. The contribution of the Western Cape WEF grid connection to the cumulative impact of all the grid connections and existing HV lines is thus very low. The cumulative impact of all the planned grid connections and existing HV lines on priority avifauna in the 30km radius is assessed to be medium.

Mitigation

Displacement due to disturbance and habitat transformation

- Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species.
- Construction of new roads should only be considered if existing roads cannot be upgraded.
- Measures to control noise and dust should be applied according to current best practice in the industry.
- The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned
- Formal live-bird monitoring should be resumed once the turbines have been constructed, as per the most recent edition of the Best Practice Guidelines (Jenkins et al. 2015). The purpose of this would be to establish if displacement of priority species has occurred and to what extent. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated in year 5, and again every five years thereafter for the operational lifetime of the facility.

Mortality due to turbine collisions

- A system of Shutdown on Demand (SDoD) should be implemented for all turbines at the WEF, modelled on the system which is currently operational at the nearby Excelsior Wind Farm.
- All carcasses of livestock and placentas from lambing ewes should be removed timeously from the wind farm site to prevent Cape Vultures from being attracted to the wind farm site.
- No turbines should be located in the 750m buffer zones as indicated in the sensitivity map in Figure 8.3. These buffer zones are all linked to alien tree stands, which could attract many priority species.
- Formal live-bird monitoring and carcass searches should be implemented in the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al. 2015) to assess collision rates. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated in year 5, and again every five years thereafter for the operational lifetime of the facility.

Mortality due to OHPL collision

- Bird flight diverters should be installed on the entire 132kV grid connection for the full span length according to Eskom guidelines - five metres apart on the earthwire. Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as possible after the conductors have been strung.

Mortality due to electrocutions

- The hardware in the substation is too complicated and the risk too low to warrant pro-active mitigation. The substation should be inspected weekly by the operator, and if any electrocution mortality is recorded, it should be reported to the avifaunal specialist. If the mortality levels exceed thresholds determined by the avifaunal specialist in consultation with BirdLIfe South Africa, reactive mitigation in the form of insulation or perch deterrents should be implemented.
- The vulture friendly DT 7649 steel monopole should be used for the 132kV grid.

8.2.3 Conclusion

The proposed Western Cape WEF will have a moderate impact on avifauna which, in all instances, could be reduced to a **low impact through appropriate mitigation**. The alternative BESS and substation locations are all situated in essentially the same habitat, i.e. cereal crops. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. Both grid options are located in the same habitat, namely agricultural fields. The expected impacts are therefore expected to be similar. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore both alternative alignments will be acceptable.

The currently proposed turbine lay-out which was assessed in this report avoids all the recommended avifaunal turbine exclusion zones and is therefore deemed acceptable. The development is therefore supported, provided the mitigation measures listed in this report are strictly applied.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from an Avifaunal perspective.

For the full Specialist report please refer to Appendix D.

8.3 BAT IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Arcus C/O Ashlin Bodasig to undertake a Bat Assessment for the proposed Western Cape WEF.

8.3.1 Receiving Environment and Bat Sensitivity

The structural complexity of the habitat is lacking significantly, which corresponds to a lower diversity of bat species and could be the case on the site. The project is, however, in close proximity (approximately 35 km south) to the largest known roost of the migratory Natal long-fingered bat in South Africa, located at the De Hoop nature reserve and agricultural land could host an abundance of insect prey (Wolkott, 2012). Otherwise, there is some suitable habitat for bats that can be used for roosting, foraging and commuting in the study area.

There are several potential roosting features on site that may be used by bats. These include mainly buildings and trees (which are mainly associated with the farmsteads) and rocky outcrops. There do not appear to be any large caves in the study area which suggests that there may not be large colonies of bats however several hundred bats can occupy building roosts. Investigations of rocky outcrops and buildings did not reveal any signs of roosting bats.

Reservoirs are present in the study area that will be attractive to bats. Rivers, and drainage lines will be equally important for foraging and commuting. Most of these water resources are non-perennial, and therefore only available to bats during some parts of a year. This could then restrict potential impacts to bats to periods when key resources are available. Cultivated areas are present throughout the site and are important for foraging as some species forage over agricultural fields.

Bat Sensitivity

Approximately eleven bat species can potentially occur at the proposed site. Analysis of the acoustic monitoring data suggests that at least seven species of bat are present (Table 8.1). The sensitivity of each of these species to the project is a function of their conservation status and the likelihood of risk to these species from Wind Farm development.

Free-tailed bats and Cape serotine bats are likely to face the highest risk of impacts associated with the Western Cape Wind Farm due to their prevalence. Sensitive areas including those used by bats for foraging, roosting and commuting have been mapped in Figure 8.4.

Table 8.1: Bat Species Recorded at the Project and their Sensitivity to Wind Farms

Species	Species Code	# of Bat Passes	Conservation Status[26]		Likelihood of Risk
			National	International	
Egyptian free-tailed bat *Tadarida aegyptiaca*	EFB	32,299	Least Concern	Least Concern	High
Roberts's Flat-headed Bat *Sauromys petrophilus*	RFB	11,913	Least Concern	Least Concern	High
Little free-tailed bat *Chaerephon pumilus*	LFB	1,193	Least Concern	Least Concern	High
Natal long-fingered bat *Miniopterus natalensis*	NLB	11,265	Least Concern	Least Concern	High
Yellow-bellied house bat *Scotophilus dinganii*	YHB	55	Least Concern	Least Concern	Medium-High
Cape serotine *Neoromicia capensis*	CS	19,587	Least Concern	Least Concern	Medium-High
Long-tailed serotine *Eptesicus hottentotus*	LTS	45	Least Concern	Least Concern	Medium

8.3.2 Potential Impacts Identified

In terms of the construction of the proposed infrastructure on this site the following potentially negative ecological impacts have been identified:

Roost Disturbance as a result of construction activities could result in bats abandoning their roosts, particularly species that roost in trees (e.g. Cape serotine and Egyptian free-tailed bats). Since the site is primarily agricultural land, there is very little roosting potential on site. However, some potential roosting sites such as trees and buildings associated with farmsteads are present. If all buffers of the sensitivity map are adhered to, **significance of the impact should be low**.

Roost Destruction, through the physical destruction of roosts (include trees, crevices in rocky outcrops and buildings) during construction. Impact results from displacement, reduction in roosting sites and killing bats during the process of destroying roosts. Since the site is primarily agricultural land, there is very little roosting potential on site. However, some potential roosting sites such as trees and buildings associated with farmsteads are present. If all buffers of the sensitivity map are adhered to, **significance of the impact should be low**.

Habitat Modification, including the removal of vegetation cover and linear features that some bats use for foraging and commuting, displacement from foraging habitat by the construction of wind turbines, and the creation of new structures and linear features. This modification could also create favourable conditions for insects upon which bats feed which would in turn attract bats to the proposed wind farm area. **Since most of the site is agricultural land, this impact is unlikely to occur.**

[26] Child, M.F., Roxburgh, L., Do Linh San, E., Raimondo, D., Davies-Mostert, H.T. eds., 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

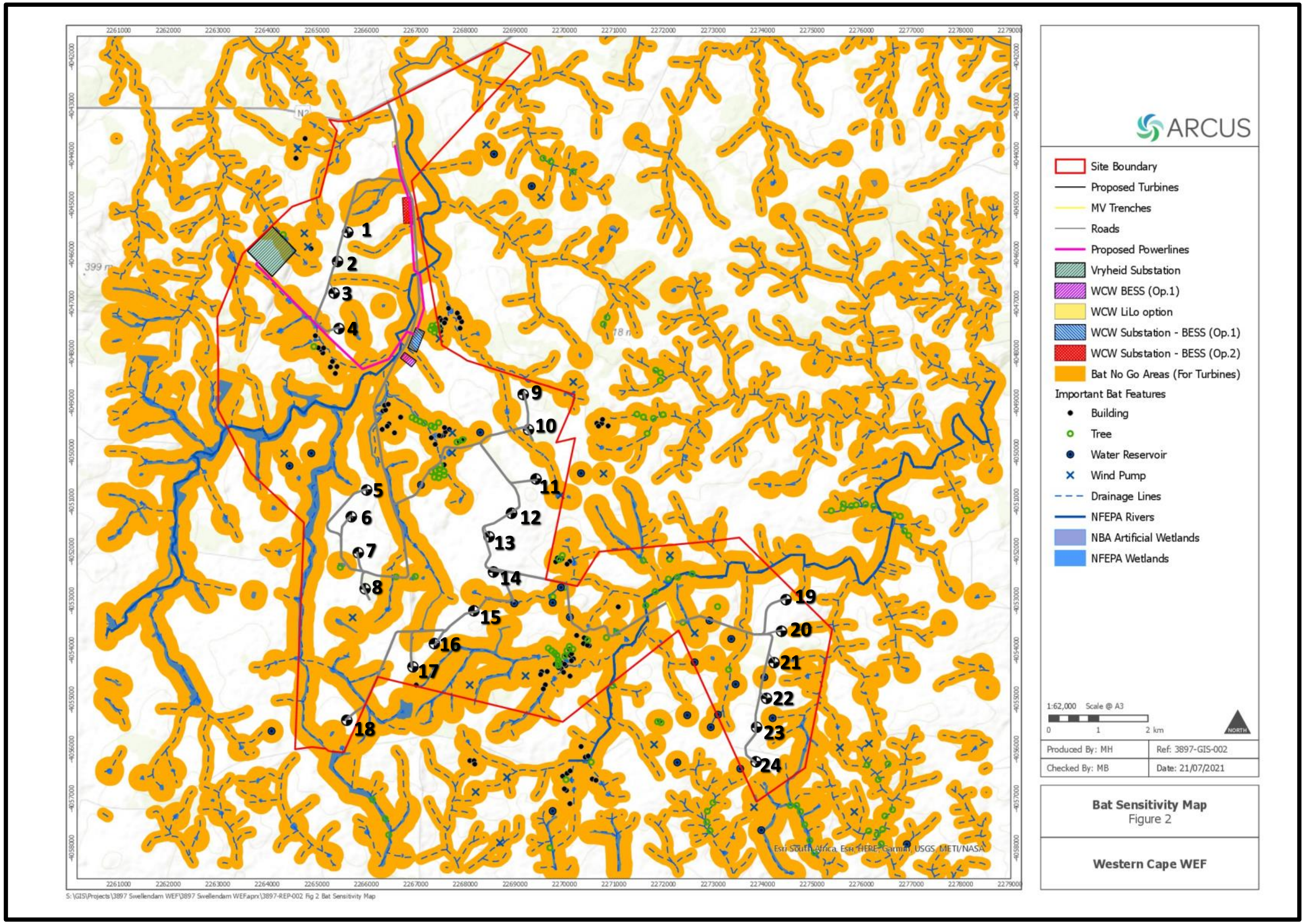


Figure 8.4: Bat Sensitivity Map for the proposed Western Cape WEF, indicating the bat No-Go (Buffer) zones for turbines.

Light Pollution during Construction and Operational Phases. Certain bat species actively forage around artificial lights due to the higher numbers of insects which are attracted to these lights. This may bring these species into the vicinity of the operating turbines and increase the risk of collision/barotrauma for these species. This impact is likely to be low with mitigation but must be carefully considered because the consequence could be severe without mitigation. **With mitigation this impact will have little to no effect.**

Habitat Creation in High-Risk Locations. Building infrastructure may inadvertently provide new roosts for bats, attracting them to the area and indirectly increasing the risk of negative mortality impacts.

Mortality during commuting and/or foraging, is the major potential impact of wind turbines on bats, resulting from collision with turbine blades, OHPLs or substations, as well as turbine related barotrauma. These impacts will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines. Six of the seven species of bat that were recorded at the project exhibit behaviour that may bring them into contact with wind turbine blades and have high activity on site, so they are potentially at risk of the severe negative impacts of mortality.

Mortality during migration, is considered here as a separate impact to communing and/or foraging related mortalities on account of migratory species appearing to be particularly susceptible to Wind Farm related mortalities, possibly on account of some bats not echolocating during migration. The Natal long-fingered bat is the only species known to occur at the site that exhibits long-distance migratory behaviour, and the project is in close proximity (approximately 35 km south) to the largest known roost of the migratory Natal long-fingered bat in South Africa, located at the De Hoop nature reserve. It is difficult to determine if unacceptable numbers of mortality will occur during migration periods but during the operating lifespan of the Wind Farm it may be possible that migration patterns and species distributions may change in response to climactic and/or habitat shifts. There may also be inter-annual variation in bat movement patterns which cannot be observed with a single year of data collection. With the current data the effects on bats could be severe without mitigation and have moderate effects with mitigation.

Cumulative impacts.

The cumulative impact on bats was considered by searching for current and potential future development of wind energy facilities within a 50 km radius of the project. There is currently one operational wind energy facility (Excelsior Wind Farm) and at least five Renewable Energy Facilities (four of which are Wind Energy Facilities), planned or approved, within this radius based on the Department of Environmental Affairs Renewable Energy Development Database Quarter four 2020.

Cumulative indirect impacts to bats, such as those relating to changes to physical environment (e.g. roost and habitat destruction) are likely to be moderate across the cumulative impact regions if site-specific mitigation measures are adhered to by all renewable energy developments.

Cumulative direct impacts to bats, specifically related to bat mortality, are likely to have a high significance before mitigation but could reduce to medium significance with appropriate turbine siting and operational mitigation as determined by preconstruction and operational monitoring studies, dependent on all other surrounding wind energy facilities also adopting similar mitigation strategies to reduce impacts to bats.

At this time, impacts to bats are low to medium but would increase when more Wind Farms are constructed.

Mitigation measures

Pre-Construction and Planning Phase

- The turbine layout must adhere to the bat sensitivity buffer zones (Figure 8.4). Turbines must be sited outside of buffer areas such that blade tips do not encroach into buffer zones.
- Before construction commences, a bat specialist should conduct a site survey, covering the final road and power line routes as well as the final turbine positions, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats.
- If occupied roosts are confirmed these should be buffered based on best practise guidance, which includes a minimum buffer of 200 m.
- The height of the lower blade swept height must be maximised, and should not be lower than 50m if possible, to minimise collisions with low flying species.

Construction Phase

- Laydown areas and temporary access roads must be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation. Construction should, where possible, be situated in areas that are already disturbed.
- The removal of vegetation, particularly trees, must be kept to a minimum, and should also not occur in the no-go areas of the Bat sensitivity map.
- Following construction, rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a botanical specialist and included within the EMPr.

Operational Phase

- Apply blade feathering to prevent unnecessary free-wheeling of blades below generation cut-in speed at operation commencement.
- On-site lighting must be kept to a minimum, with only lighting essential for operation of the facility.
- Where necessity, only lighting with a low attractiveness for insects should be used. These include low-pressure sodium and warm white LED lights. High pressure sodium and white mercury lighting should not be used as far as possible.
- Lighting should be fitted with movement sensors to limit illumination and light spill, and the overall lit time. In addition, the spread of light should be directed downward (below the horizontal plane) to minimise light trespass and sky glow.
- Spacing between lights, and the height of light units, should be maximised where possible to reduce the intensity and volume of the light, and to minimise the area illuminated.

- Bats must be prevented from entering any possible artificial roost structures (e.g. roofs of buildings, road culverts and wind turbines) by ensuring that they are sealed in such a way as to prevent bats from entering.
- If bats colonise Wind Farm infrastructure, a suitably qualified bat specialist must be consulted before any work is undertaken on that infrastructure or attempting to remove bats.
- Ongoing maintenance and inspections of buildings and road culverts must be carried out to ensure access by bats is prevented and for the safe handling of actively roosting bats.
- Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels.
  - Operational monitoring must be done for the first two years initially according to the guidelines. Depending on these findings, additional monitoring may be needed but must be determined by an appropriate bat specialist using the operational data. Thereafter, a year of impact monitoring is required in the fifth year of operation and every five years after that. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level.
  - Apply curtailment based on a curtailment plan formulated by an appropriate bat specialist using weather and bat activity data from the site if mortality occurs beyond threshold levels (i.e. 141 bats) as determined based on applicable guidance (MacEwan et al. 2018). The threshold calculations must be done at a minimum of once a quarter (i.e. not only after the first year of operational monitoring) so that mitigation can be applied as quickly as possible should thresholds be reached.

8.3.3 Conclusion

At this stage, the data suggests that there could be a risk to bats posed by wind energy development at the site. Provided all mitigation measures listed in this report are strictly adhered to, the independent Specialist has indicated that the **impacts to bats are low to medium**, has not identified any fatal flaws with the project and has indicated that the "the proposed Western Cape Wind Farm may be compatible with bat conservation". A pre-construction monitoring campaign should be conducted to ensure impacts are kept to a minimum.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a Bat perspective, **provided all mitigation measures are adhered to.**

8.4 BOTANICAL IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Nick Helme Botanical Surveys C/O Nick Helme to undertake a Botanical Impact Assessment for the Western Cape WEF.

8.4.1 Receiving Environment

The study area lies within the Core Cape Subregion (CCR) of the Greater Cape Floristic Region (GCFR). The study area is also part of the Fynbos biome and is located within the East Coast Renosterveld bioregion (a finer scale classification). Data from the Threatened Species program (Red Listing) for South Africa indicate that 67% of the rare or threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009). It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species. Developments in this area thus need to take this into account.

The study area is part of the East Coast Renosterveld bioregion. This bioregion has a distinct and rich flora, with a high number of regionally endemic plant species, as well as many plant Species of Conservation Concern (Raimondo *et al* 2009), thanks to high levels of habitat loss to agriculture.

The CapeNature Biodiversity Spatial Plan (Pence 2017) has mapped priority conservation areas throughout the province, using best available data, and the resultant maps display Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Other Natural Areas (ONAs). The relevant extract is shown in Figure 8.5, and shows that most Renosterveld patches are mapped as CBA1 or BA2, and most watercourses as ESA2.

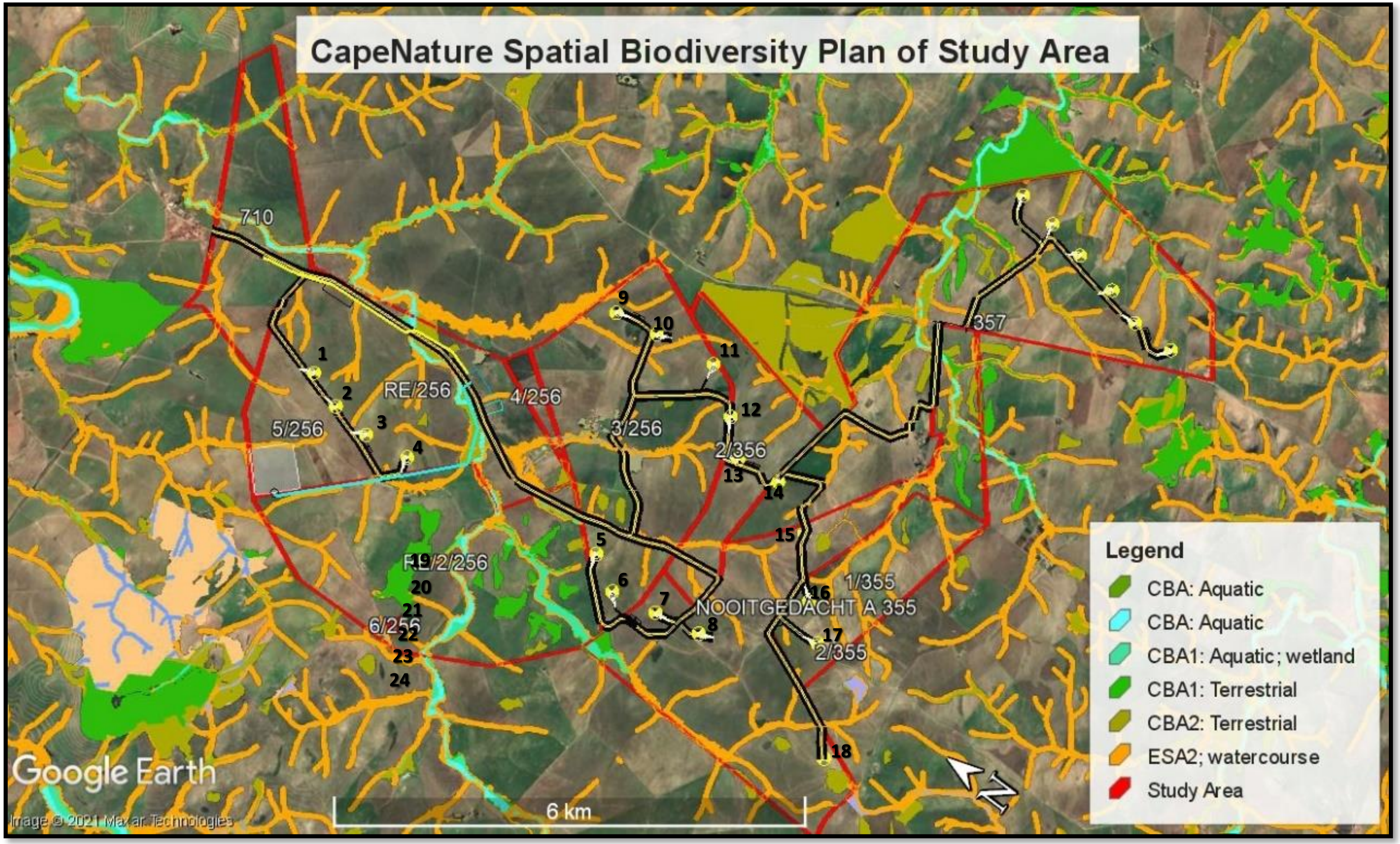


Figure 8.5: Extract of CapeNature Biodiversity Spatial Plan, showing that most Renosterveld patches are mapped as CBA1 or CBA2, and most watercourses as ESA2.

Botanical Sensitivity

The SA Vegetation Map shows that the dominant original vegetation type in the study area has been mapped as **Eastern Ruens Shale Renosterveld**, with **Cape Lowland Alluvial Vegetation** in the main drainage lines. There is also a small patch of **Ruens Silcrete Renosterveld.**

Eastern Ruens Shale Renosterveld is classified as a **Critically Endangered** habitat on a national basis, according to the gazetted list (DEA 2011). About 19% of the original total extent of this vegetation type still remains, and less than 1% is formally conserved, with a national conservation target of 27% of its total original extent, which is thus impossible to achieve (Rouget *et al* 2004). Strangely the new NBA (not yet gazetted) has downlisted the unit to Endangered, as it apparently does not meet the new threshold for Critically Endangered, which I find very unlikely (Skowno *et al* 2019). This vegetation type is typical of shale derived soils in the eastern Overberg, and is relatively homogenous throughout its range, with a relatively low number of vegetation type endemics but many plant Species of Conservation Concern (due to high levels of habitat loss).

Cape Lowland Alluvial Vegetation is classified as a **Critically Endangered** habitat on a national basis, according to the gazetted list (DEA 2011). About 31% of the original total extent of this vegetation type still remains (as of 2004), and less than 1% is formally conserved, with a national conservation target of 31% of its total original extent (Rouget *et al* 2004). Strangely the new NBA (not yet gazetted) has downlisted the unit to Endangered, as it apparently does not meet the new threshold for Critically Endangered, which I find very unlikely (Skowno *et al* 2019).

Ruens Silcrete Renosterveld is classified as a **Critically Endangered** habitat on a national basis, according to the gazetted list (DEA 2011). About 22% of the original total extent of this vegetation type still remains (as of 2004), and less than 1% is formally conserved, with a national conservation target of 27% of its total original extent (Rouget *et al* 2004). Strangely the new NBA (not yet gazetted) has downlisted the unit to Endangered, as it apparently does not meet the new threshold for Critically Endangered, which I also find very unlikely (Skowno *et al* 2019).

Low and Medium Sensitivity Areas

Low and Medium sensitivity areas cover about 90% on the study area, with by far the majority being Low sensitivity cultivated or fallow lands. Disturbance includes cultivation, farm buildings, kraals, etc. Indigenous plant diversity in these areas is very low to low, and is made up of common and widespread, resilient species of no conservation significance. No populations of plant Species of Conservation Concern (SoCC) were recorded, and none are likely to persist in these areas.

High Sensitivity Areas

High sensitivity terrestrial areas cover about 5-7% of the study area, and if one adds the High sensitivity wetland areas this rises to about 10-15%. These areas are generally undisturbed, or only lightly disturbed. If previously disturbed, the areas have rehabilitated naturally very well. Alien invasive plant density is generally less than 1%. Seven confirmed **plant Species of Conservation Concern** (SoCC) were recorded in the High sensitivity areas and a few others are likely to be present but undetected (seasonality, cryptic, etc). SoCC recorded in the High sensitivity areas are given in the Specialist report (Appendix D). **None of the recorded SoCC are likely to be impacted by the proposed development layout.**

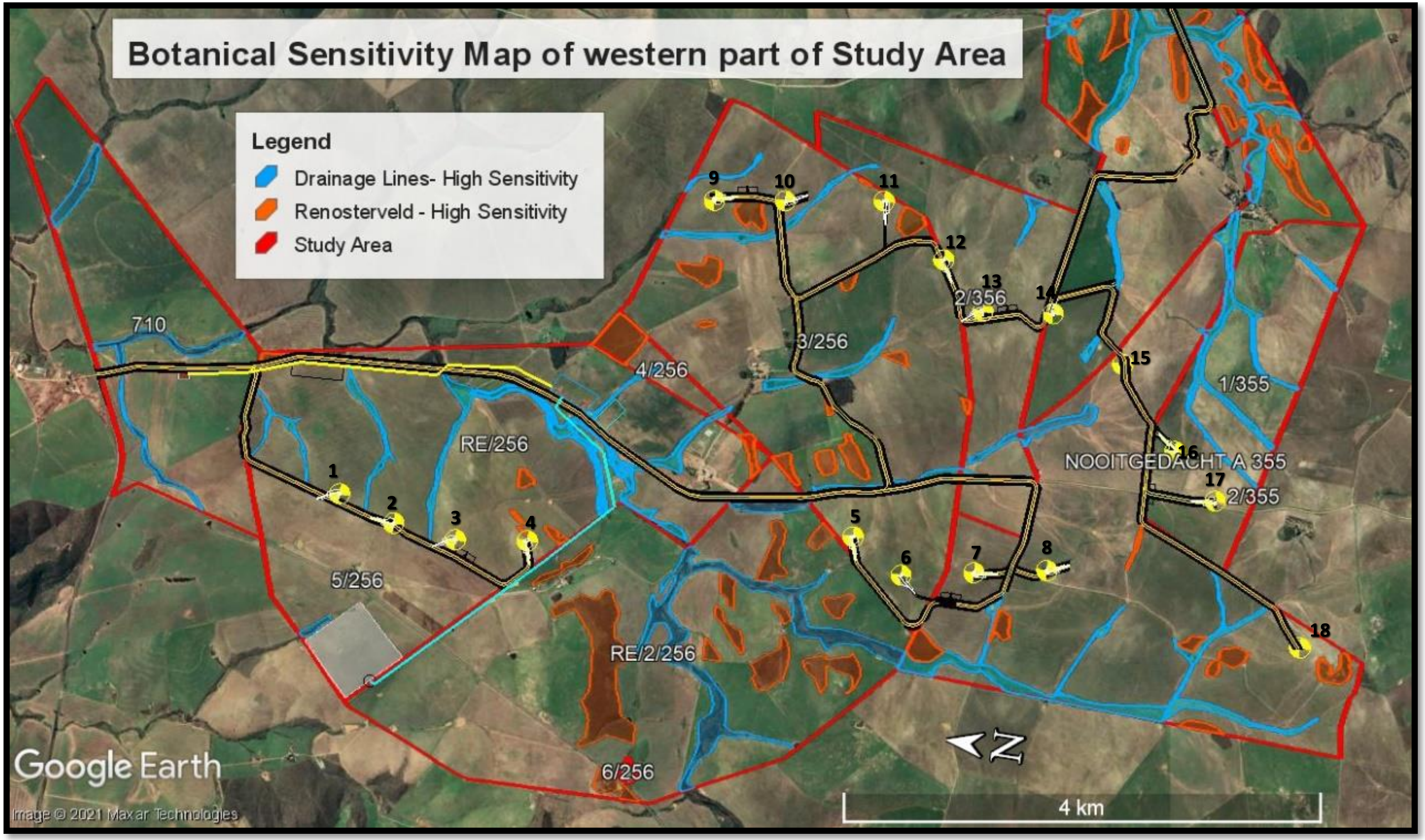


Figure 8.6: Botanical sensitivity map of the western part of the study area, with proposed development layout superimposed. All unshaded areas in the study area are of Low or Medium sensitivity, and High sensitivity drainage lines are shown in blue.

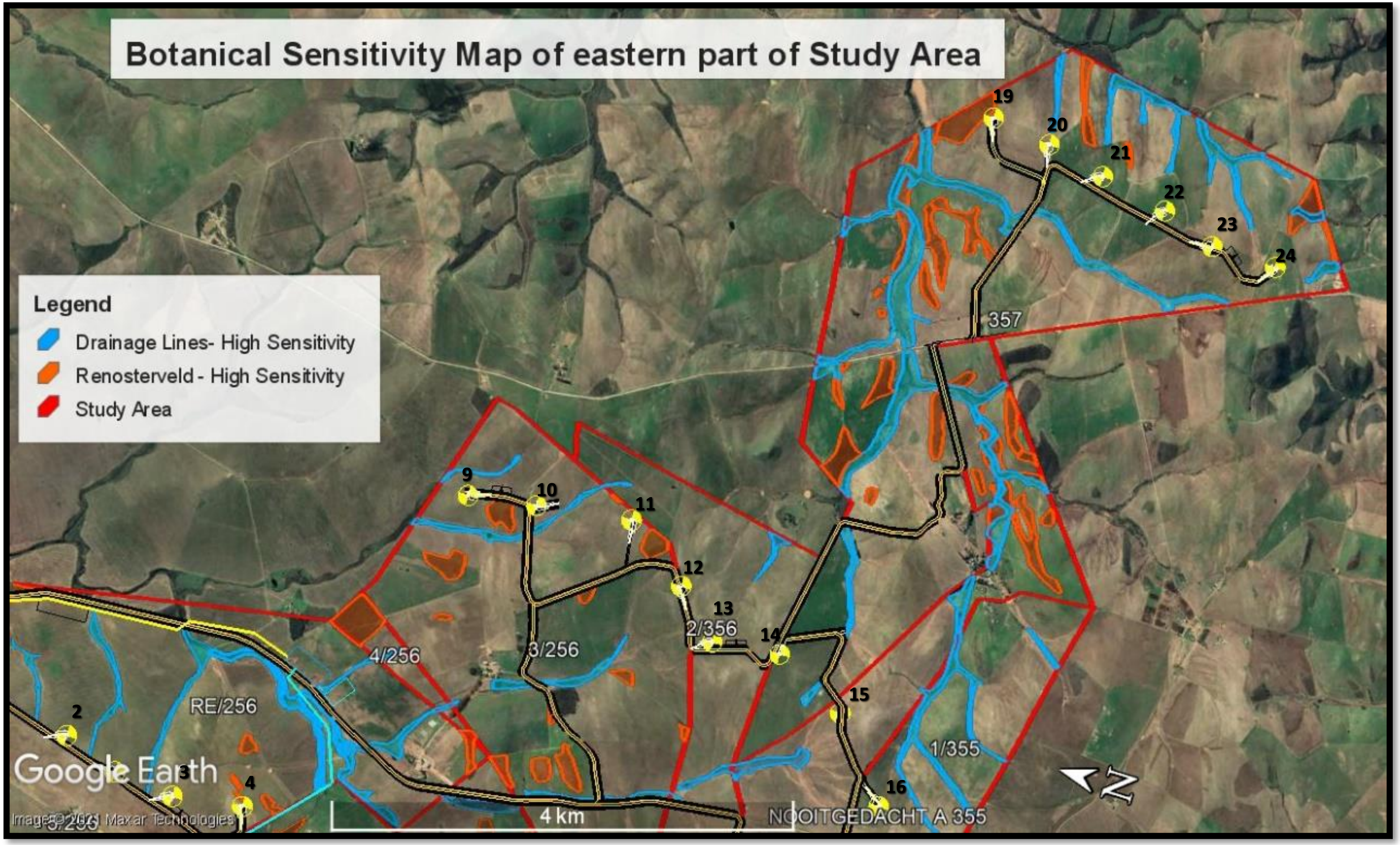


Figure 8.7: Botanical sensitivity map of the eastern part of the study area, with proposed development layout superimposed. All unshaded areas in the study area are of Low or Medium sensitivity, and High sensitivity drainage lines are shown in blue.

8.4.2 Likely Botanical Impacts

Botanical impacts may be both direct and indirect, the former usually occurring at the construction phase, and the latter during the operational phase. Direct impacts will be permanent (>15 years).

Construction Phase Impacts
The primary potential construction phase impact is permanent loss of natural vegetation within the site development footprint, but the layout has been carefully designed to avoid all mapped areas of High botanical sensitivity. The only areas where the development will cause some loss of existing habitat is where existing farm tracks will need to be widened by a few metres to accommodate the large vehicles that bring in the turbines and blades. No loss of plant Species of Conservation Concern is likely. The significance of this loss of vegetation is **Low negative** before and after mitigation.

Operational Phase Impacts
No operational phase botanical impacts are anticipated due to the proposed development. The development is not likely to cause further loss of ecological connectivity or habitat connectivity, nor to disrupt current fire regimes in natural habitat remnants.

Cumulative Impacts
The remaining indigenous vegetation on the site is regionally significant in that it is representative of a nationally threatened vegetation type, and includes at least 7 threatened plant species, and the cumulative impact of the loss of this vegetation would thus be important. However, the proposed project will not result in any significant loss of this natural vegetation, as virtually all the infrastructure will be placed within fallow or cultivated lands. The overall cumulative botanical impact of the loss of natural vegetation in the study area would be Very Low negative.

Mitigation

No special mitigation is required, as the proposed project layout has taken the botanical constraints into account and avoids the main sensitive areas as far as possible.

8.4.3 Conclusion

At least seven different plant Species of Conservation Concern were recorded in the study area, but none in the proposed development footprints. The proposed development layout largely avoids all the identified patches of High sensitivity vegetation, and consequently is likely to have a Very Low negative botanical impact, before and after mitigation, which is the same as the No-Go alternative. All BESS and substation alternatives are acceptable from a botanical perspective, being in cultivated lands, and with Neutral botanical impacts.

The proposed development is thus supported from a botanical perspective, without any further mitigation.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a Botanical perspective.

For the full Specialist report please refer to Appendix D.

8.5 FRESHWATER IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed BlueScience C/O Antonia Belcher to undertake a Freshwater Impact Assessments for the proposed Western Cape WEF.

8.5.1 Receiving Environment

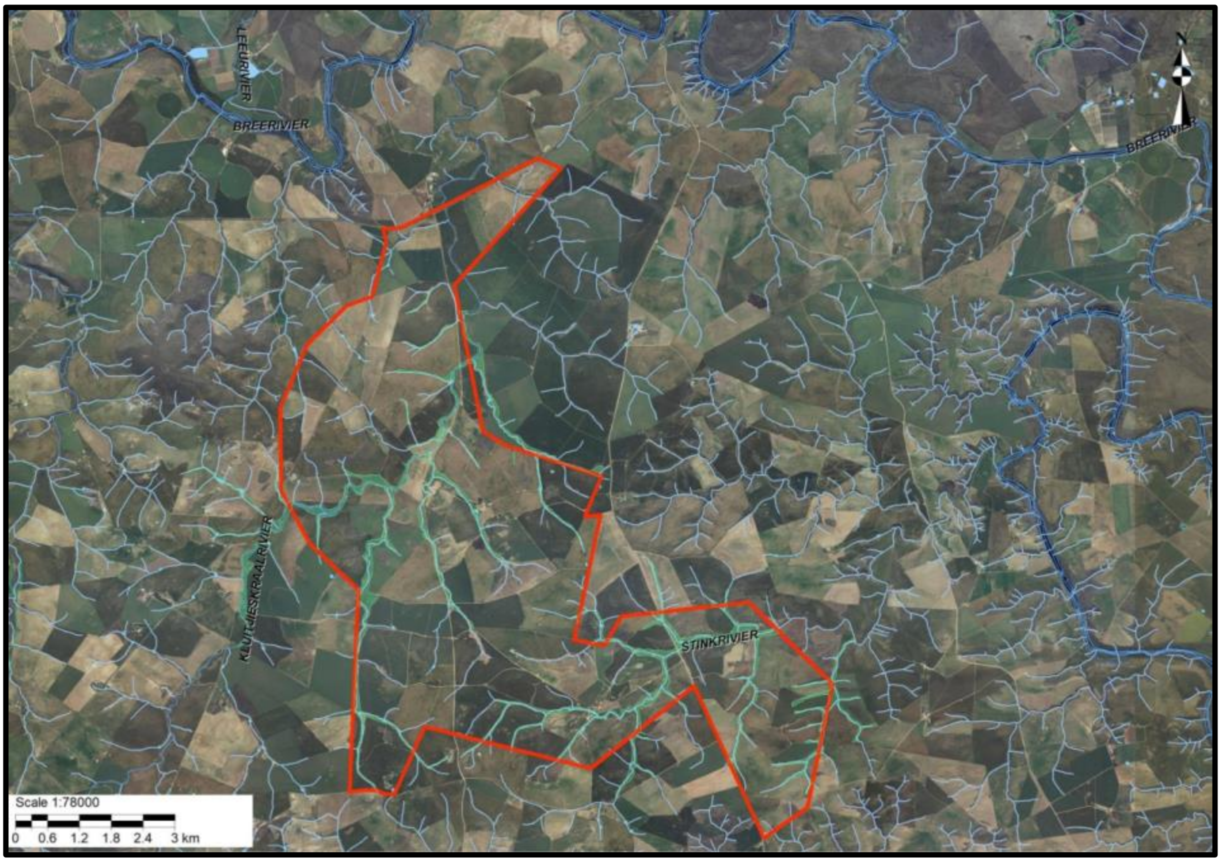


Figure 8.8: This figure shows the location of the main aquatic features within the Western Cape WEF Site.

The proposed Western Cape WEF is located on the low hills within the catchments of the Kluitjieskraal and Stink Rivers, tributaries in the lower Breede River Catchment System, and fall within the Breede Gouritz Water Management Area.

The aquatic features within the study area consist of the Kluitjieskraal and Stink Rivers and their lesser, unnamed tributaries, as well as some valley bottom wetlands associated with the larger watercourses.

Flow in the larger rivers tends to be seasonal while that in the smaller tributaries (ephemeral streams) is episodic with very little to no flow in the rivers for much of the year. Water flow for most of the watercourses typically only occurs for a short period following localised rainfall. These rainfall events tend to mostly occur in the higher rainfall months. When flow occurs in the watercourses it tends to occur as a high flow event. The flow pattern highlights the important role that wetland habitat and instream vegetation play in these watercourses in retaining runoff and preventing erosion.

The ecological habitat integrity of the larger rivers and their associated valley bottom wetlands within the study area are moderately modified. The smaller tributaries are more impacted by the surrounding agricultural activities and are in a largely to severely modified ecological condition.

In terms of biodiversity importance, the study area is located within an Upstream River Freshwater Ecosystem Priority Area. The larger Kluitjieskraal and Stink Rivers with their associated valley bottom wetland are mapped as aquatic Critical Biodiversity Areas (CBAs) and Freshwater Ecosystem Priority Area (FEPA) wetlands. The remainder of the watercourses is mapped as aquatic Ecological Support Areas (ESAs).

Freshwater Sensitivity

The watercourses in the study area are non-perennial. As a result, it is highly unlikely that any indigenous fishes occur within the rivers and the amphibian diversity within the study area is likely to be relatively low. No species of conservation concern are known to occur in the study area from an aquatic perspective. The species likely to be present are quite widespread and of low conservation concern. These include the Southern Dainty Frog, *Cacosternum australis* (Data Deficient), the Cape Sand Frog, *Tomopterna delalandii* and the Raucous Toad, *Sclerophys capensis*. The latter two amphibian species are listed as “Not Threatened”.

The larger watercourses in the study area, have a high ecological importance and sensitivity while the smaller tributaries/drainage features are of a moderate ecological importance and sensitivity. The larger watercourses tend to be more ecologically important but less sensitive to impacts while the smaller tributaries are less ecologically important but more sensitive to flow, water quality and habitat modification. The wetland features within the study area are considered of moderate to high ecological importance and sensitivity.

This assessment is in support of a recommended category for Moderately modified […] for all the watercourses which would imply that any proposed development adjacent to the watercourses should not impact on the watercourse’s ecological integrity but where possible should try to improve their condition.

8.5.2 Potential Impacts Identified

The proposed WEF and associated infrastructure have the potential to impact the freshwater features if located within or immediately adjacent to the aquatic features.

Most of the potential aquatic ecosystem impacts of the proposed WEF are likely to take place during the construction phase. These potential impacts and the associated issues identified include:

- Disturbance of aquatic habitats within the watercourses and wetland areas with the associated impacts to sensitive aquatic habitats and biota;
- The removal of indigenous riparian and instream vegetation that will reduce the ecological integrity and functionality of the watercourses;
- If there is a demand for water for construction from the local water resources, it could place stress on the existing available water resources;
- Alien vegetation infestation may occur within the aquatic features due to disturbance of areas currently covered with indigenous vegetation; and
- Increased sedimentation and risks of contamination of surface water runoff during construction.

During the operational phase of the proposed WEF, potential impacts would include:

- Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to infrastructure that needs to be maintained. Considering the current state of modification of the landscape within the site as a result of existing agricultural activities, this impact is likely to be very low;
- Modified runoff characteristics from hardened surfaces that have the potential to result in erosion of hillslopes and watercourses; and
- Water supply (and possibly sanitation services) required for the operation of the facility – this is generally low volumes and thus the potential impact would be very low.

As there is some flexibility relating to the exact location of the project components (turbines, OHPLs, substations , BESS and service roads) within a large project site, it is usually easy to mitigate the impact of the structures on the freshwater features within the site by locating them sufficiently far enough away from the freshwater features. The aquatic constraints mapping and recommended buffers will inform the proposed layout for the site (Figure 8.9).

With regards to the aquatic constraints (watercourses, wetlands and the 50m buffers) and the proposed WEF layout, only one of the turbines in the eastern extent of the study area is located within 50m of a minor tributary of the Stink River. The proposed substation and BESS areas will need to all be shifted slightly to move them outside of the recommended 50m buffers. All of these areas are associated with minor and highly modified tributaries of the larger rivers where the potential aquatic ecosystem impacts are deemed to be very low to negligible.

EAP Addition to Final BAR: The proposed substation and BESS will be microsited to ensure it is located outside of the buffers. This was also included in the EMPr.

The internal roads are to be placed along existing farm roads, many of which are within the recommended buffers or through the watercourses.

The potential aquatic ecosystem impacts associated with the two BESS alternatives would be very similar, both being similarly located adjacent to the Kluitjieskraal River and buffer area.

The proposed powerline alternatives would also have similar impacts. The powerline rebuild is longer but is located outside of the aquatic buffer areas. The shorter new powerline alternative is located adjacent and within aquatic buffers.

Mitigation Measures:

With mitigation, the potential freshwater impacts of the proposed Western Cape WEF for the construction, operation and decommissioning phases are likely to be low. One can also expect that the cumulative impact of the proposed project would not be significant provided mitigation measures are implemented. Recommended mitigation measures to be included in the environmental authorisation are as follows:

- The existing road infrastructure should be utilised as far as possible to minimise the overall disturbance created by the proposed project.
    - Where new roads need to be constructed, the existing road infrastructure should be rationalised and any unnecessary temporary roads decommissioned and rehabilitated to reduce the disturbance of the area and within the river beds.
    - For new roads to the turbines, these should be located at least 50m outside of the drainage/riverbeds.
    - Where access routes need to be constructed through the watercourses, the disturbance of the channels should be limited.
    - Wetland areas should be avoided and any road adjacent to a wetland feature should also remain outside of the 50m buffer zone.
- All crossings over watercourses should be such that the flow within the drainage channel is not impeded and should be constructed perpendicular to the river channel, where possible based on the contours. Road infrastructure and cable alignments should coincide as far as possible to minimise the impact.
- Any indigenous vegetation clearing within or adjacent to the watercourses should occur in a phased manner to minimise erosion and/or run-off. An Environmental Control Officer or a specialist with knowledge and experience of the local flora should be appointed during the construction phase to be able to make clear recommendations with regards to the revegetation of disturbed areas.
- During the construction phase, site management must be undertaken at the laydown area, batching plant and the individual turbine construction areas. This should specifically address on-site stormwater management and prevention of pollution measures from any potential pollution sources during the construction activities such

as hydrocarbon spills. Any stormwater that does arise within the construction sites must be handled suitably to trap sediments and reduce flow velocities.

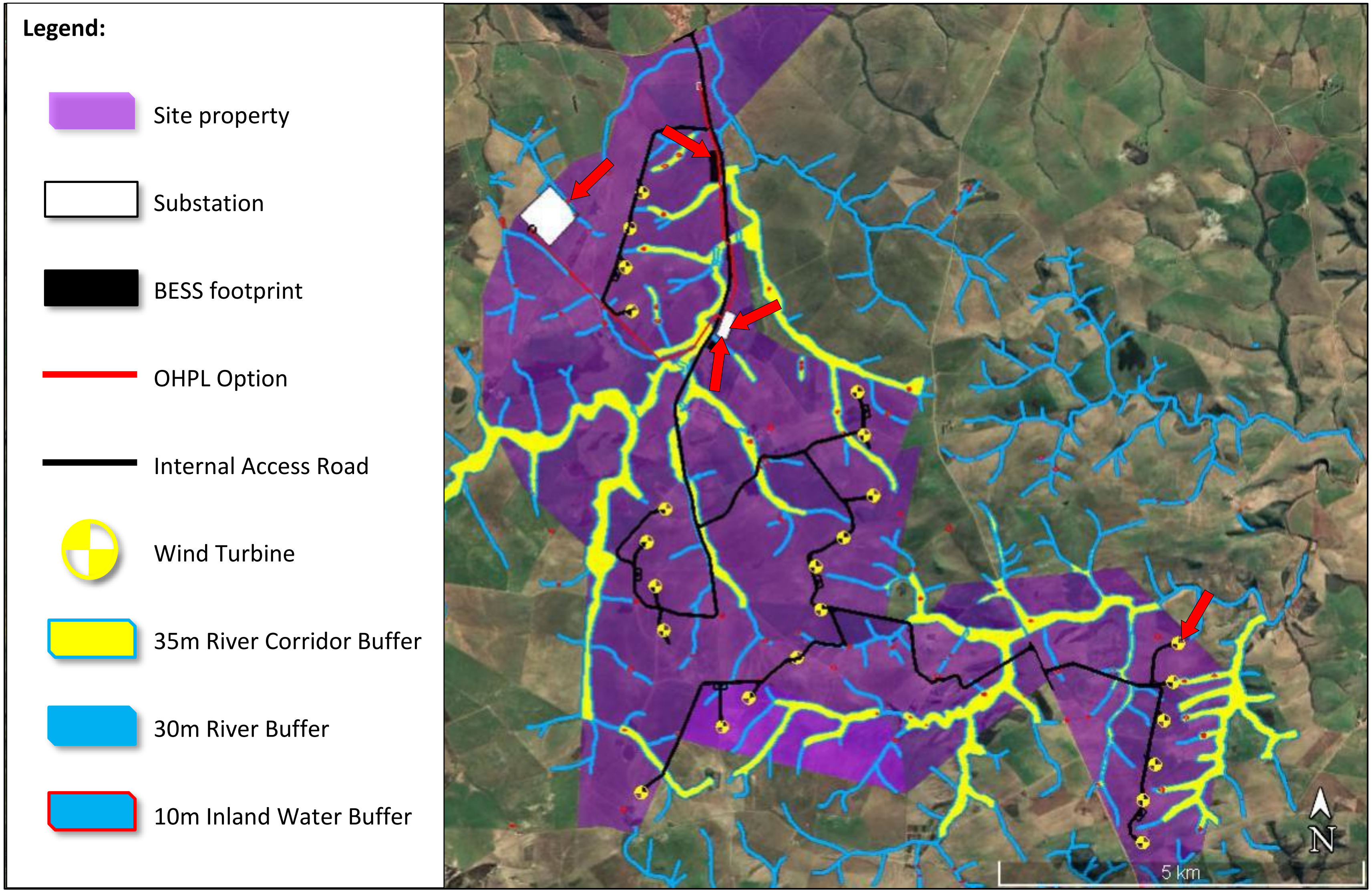


Figure 8.9: Map of the proposed project layout and the recommended buffer / setback area for aquatic features within the site. Points at which the proposed layout lies within the recommended buffers are indicated by the red arrows.

- Any disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth.
- Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants.
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the WEF site. The runoff from hardened areas should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate channels and swales when located within steep embankments to prevent erosion. Should any erosion features develop, they must be stabilised as soon as possible.
- Any water supply, sanitation services as well as solid waste management services that should be required for the site should preferably be provided by an off-site service provider.
- During decommissioning, disturbance to the freshwater ecosystems should be limited as far as possible. Disturbed areas may need to be rehabilitated and revegetated. Mitigation and follow up monitoring of residual impacts (alien vegetation growth and erosion) may be required.

8.5.3 Conclusion

The risk assessment determined that the proposed development of the WEF poses a **low risk** of impacting aquatic habitat, water flow and water quality. With these findings of the risk assessment, the water use activities associated with the proposed project could potentially be authorised by means of the general authorisations for Section 21(c) and (i) water uses.

Based on the above findings, there is no reason from a freshwater perspective, why the proposed activity (with the implementation of the above-mentioned mitigation measures) should not be authorized.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a Freshwater perspective.

For the full Specialist report please refer to Appendix D.

8.6 HERITAGE IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed CTS Heritage C/O Jenna Lavin to undertake Heritage Impact Assessment for the proposed Western Cape WEF.

8.6.1 Receiving Environment

Cultural and Archaeological

The proposed development is located approximately 15km southwest of Swellendam along the Breede River. Swellendam is a very significant historic town and is the third oldest town in South Africa after Cape Town and Stellenbosch, having been established in 1743. The town has over 50 provincial heritage sites, most of them buildings of Cape Dutch architecture. It is very likely that the proposed WEF will be visible from the historic centre of this significant town. Additionally, it is noted that this is not the only renewable energy facility proposed for this area.

The presence of perennial water in this area has meant that it has been occupied since the Stone Age, first by hunter-gatherers, and, more recently, by pastoralists. The VOC began loaning land to farmers in this region in the 1700s, and it became increasingly intensively farmed for stock and, particularly wheat (Deacon 2006, NID 4731). The early farming of the area has intensified and diversified to create the cultural landscape as it exists today. Furthermore, the historic significance of the Breede River must be noted, which, due to its navigability, a rare feature in South African rivers, was used to transport goods from the Cape to the interior in the nineteenth century (“Breede River Trading Post” 2016). The relationship between the river, the rolling hills of the undulating landscape as well as the siting of historic buildings and far werfs contribute to the significance of this cultural landscape.

Based on the information available in SAHRIS, very few Heritage Impact Assessments have been conducted in proximity to the proposed development area (Figure 2). De Kock et al (2012) conducted a detailed and in-depth HIA for the proposed Goereesoe WEF located approximately 10km southwest of this proposed development area. In the Archaeology Specialist Assessment that forms part of this HIA, Webley (2012) notes that “Little is known of the archaeology of the Riviersonderend and Swellendam areas. The archaeological record shows that prehistoric archaeological settlement is predominantly represented by open sites in these areas. These sites and artefact scatters are largely restricted to areas that have not been extensively disturbed by cultivation and are often located within drainage lines, or on koppies, however significant archaeological resources have been found within cultivated areas in other contexts. A Heritage Impact Assessment was conducted by Magoma and Matekenya (2016) for the proposed Vryheid Network Strengthening Project (SAHRIS NID 356842). The area assessed in this HIA partly overlaps with the proposed development area. While no significant archaeological resources were identified in their assessment, this landscape remains sensitive for impacts to significant archaeological heritage.

Geology

The Swellendam WEF project area is almost entirely underlain by marine sediments of the Lower Bokkeveld Group (Ceres Subgroup, Cape Supergroup) of Early to Middle Devonian age. These marine rocks were probably highly fossiliferous originally, containing rich assemblages of shelly invertebrates and trace fossils, as well as drifted land plant remains, fish and microfossils. However, on the southern coastal plain their fossil content has been largely destroyed by intense tectonic deformation during the Permo-Triassic Cape Orogeny (mountain-building event) as well as by deep chemical weathering beneath the so-called “African Surface” under humid tropical climates during the Late Cretaceous to Tertiary period. A small outcrop area of slightly younger, Middle Devonian sediments of the Bidouw Subgroup (Upper Bokkeveld Group) is mapped right on the south-eastern margins of the WEF project area. Judging by good exposures of these rocks along the Brede River Valley to the east as well as elsewhere in the Swellendam region, the Bidouw Subgroup bedrocks are highly deformed, cleaved and weathered and therefore unlikely to be fossiliferous.

Palaeontology

According to the SAHRIS Palaeosensitivity Map, the majority of the area proposed for development is underlain by sediments of very high palaeontological sensitivity (Specialist Report, Figure 4a). Almond (2012) conducted a Palaeontological Impact Assessment for the proposed Goereesoe WEF and found that, similar to this proposed development area, “These marine to estuarine rocks were probably highly fossiliferous originally, containing rich assemblages of shelly invertebrates and trace fossils, as well as drifted land plant remains, fish and microfossils. However, on the southern coastal plain their fossil content has been largely destroyed by intense tectonic deformation during the Permo-Triassic Cape Orogeny (mountain- building event) as well as by deep chemical weathering beneath the so-called “African Surface” under humid tropical climates during the Late Cretaceous to Tertiary period. Exposure of these Palaeozoic rocks is very limited due to extensive cover by superficial sediments (mainly pedocrete lag gravels, soils, alluvium) that are themselves very poorly fossiliferous to unfossiliferous. A variety of Paleogene (Early Tertiary) to Quaternary duricrusts […] are present in the study area, but are also largely unfossiliferous. Recent palaeontological field studies in the region have failed to yield significant fossil remains, apart from sparse, low-diversity trace fossils”. It is likely that the palaeontological sensitivity of the proposed development area is similar in nature to the Goereesoe WEF however it is recommended that this be determined through a specialist palaeontological assessment.

8.6.2 Potential Impacts Identified

Cultural Landscape

The cultural landscape assessment noted that the proposed Western Cape WEF development and associated infrastructure is likely to negatively impact on the following heritage resources:

● The N2 scenic route which is considered a highly sensitive visual receptor area;
● The historic werf and homestead of Kluitjieskraal;
● Landform that is not as capable to ‘absorb’ the proposed turbines in Landscape Character Unit B.

In the layout proposed (July 2021), the proposed turbine locations are all located more than 1km from the nearest farm werf and all proposed turbines are located more than 1km from the N2, with only 4 turbines located within 5km of the N2. As such, **no negative impact is anticipated in this regard**.

It is important to note that Landscape unit B [The 6 most south-eastern turbines] is more sensitive to the introduction of turbines due to areas of critical biodiversity that are still intact, and the landform that consist of steeper slopes. Only 6 are located within Landscape Character Unit B and these are located well-away from the identified “pockets of natural vegetation” noted here. **Limited negative impact is anticipated in this regard.** It is important to encourage agricultural activity to continue under these turbines as far as possible.

The cultural landscape assessment recommends that a buffer of 500m is implemented around the farm werfs identified within the development area in order to mitigate the negative impacts anticipated from the WEF infrastructure. (See Figure 8.10)

Archaeology

No significant heritage resources were identified within the footprint for the proposed WEF development and associated infrastructure. Four farm werfs were investigated during the field assessment, and one historic farm cemetery was located.

Overall, similar to Webley (2012), very little archaeology was identified during the field assessment. Explanations for this include the fact that a large number of the cultivated fields were unable to be surveyed, although the fields that were surveyed did not yield any archaeological resources. An additional explanation may relate to the lack of koppies or rocky outcrops within the proposed development area (Webley’s LSA findings (2012) appear to all be associated with rocky outcrops and similar geological features).

The layout provided (July 2021) does not negatively impact on any of the identified archaeological resources.

Palaeontology

Potentially fossiliferous sediments of the most widespread unit, the Bokkeveld Group, are now too weathered and deformed in general to contain more than sporadic fossil remains in most areas. No shelly fossils at all were observed during several previous field studies of Lower Bokkeveld Group sandstones and mudrocks in the Swellendam area by Almond (2010a, 2010b, 2011). During the present field study the only fossils recorded were poorly-preserved, low diversity traces within float blocks of grey-green wacke (possibly Hexrivier Formation) on Kluitjeskraal 256.

Despite the provisional Medium to Very High Sensitivity of the Swellendam WEF project area shown on the SAHRIS palaeosensitivity map, the present field survey as well as previous palaeontological field assessments in the region indicate that in practice the bedrocks and superficial sediments represented here are of **Low Palaeosensitivity.** A Low (negative) impact significance is therefore inferred for the construction phase of the proposed wind energy facility.

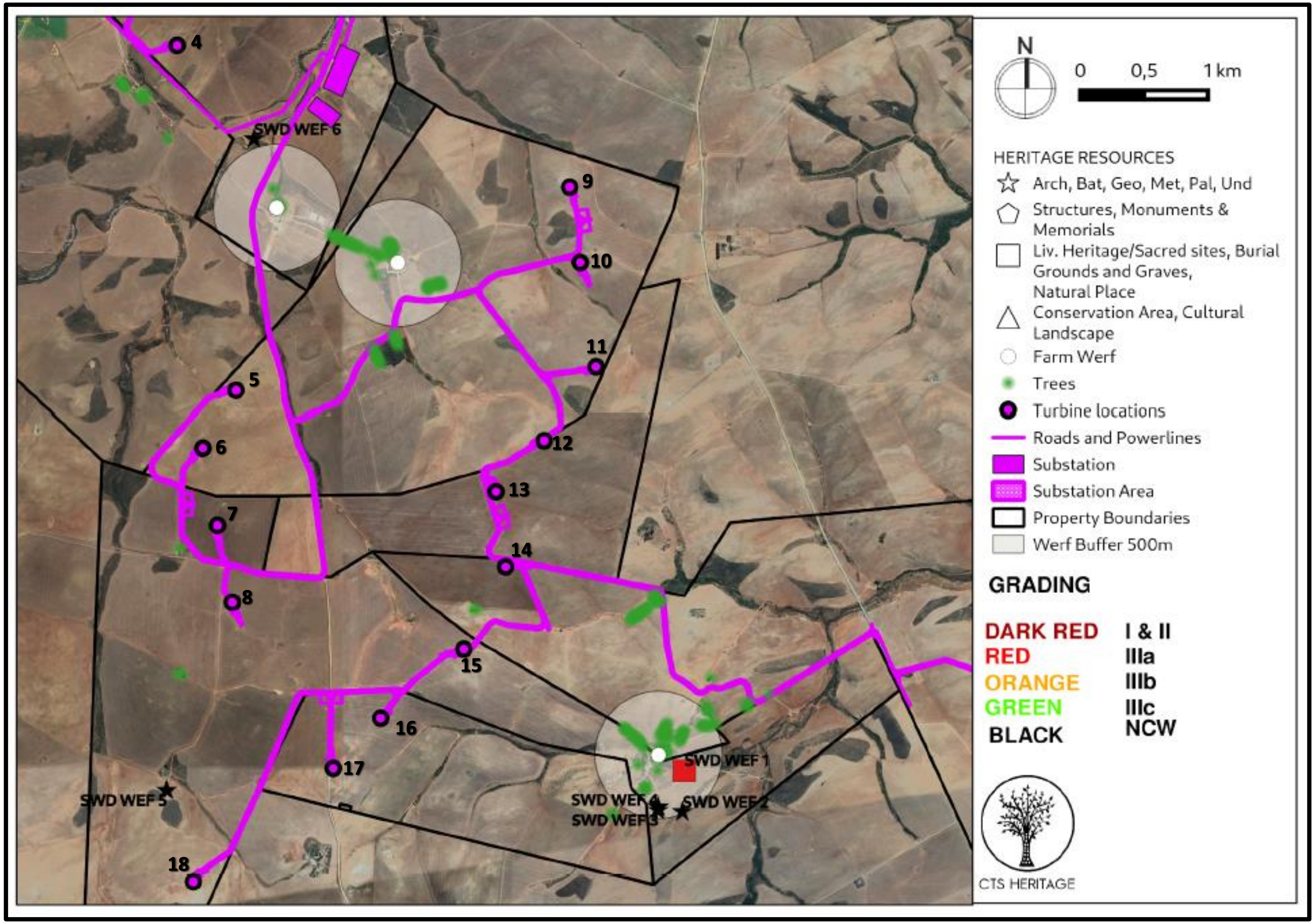


Figure 8.10: Heritage resource map for the proposed Western Cape WEF development, indicating the 500m development buffers around the farm werfs

Cumulative Impacts

At this stage, there is the potential for the cumulative impact of proposed renewable energy facilities to negatively impact the cultural landscape due to a change in the landscape character from agricultural rural to semi-industrial. Based on the available information, a number of renewable energy facilities have been approved in the immediate vicinity of the proposed WEF and it is noted that it is preferable to have renewable energy facility development focussed in an area such as a REDZ. In addition to this proposed development, there are further renewable energy facilities presently proposed for this immediate environment.

Mitigation Measures

- A no-go development buffer of 500m for wind turbine infrastructure must be implemented around the farm werfs within the development area

- The Design Criteria outlined in section 5.4 of the Specialist Report should be adhered to

  <u>Ecological Criteria</u>
  - To maintain the character of the landscape, the remaining areas of endemic and endangered natural vegetation should be conserved. See Critical Biodiversity Areas, and Ecological Support Areas, they coincide with the folds of the landscape, and drainage accumulation lines. Development of the wind turbines should not be allowed within these areas.
  - Extra care should be taken that structures of the proposed WEF development are not placed within these drainage lines and do not obstruct the flow of runoff water. Careful planning should incorporate these areas for stormwater runoff. Some of the rocks found on the site could even be used to slow stormwater, and in such a way lessen erosion on the site.
  - Areas of critical biodiversity should be protected from any damage during construction; where indigenous and endemic vegetation should be preserved at all cost.
  - An in-depth fauna and flora study should form part of the application process for the proposed development and will reveal the relevant areas of significant vegetation.
  - Areas of habitat are found among the heaps of rocks, and contribute to the biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.
  - The principle of 'tread lightly' must be applied for any activity (and associated development requirements e.g. toilets for the construction process) should be emphasised.

Aesthetic Criteria

- Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed infrastructure and structures within the surrounding agricultural landscape at ground level;
- The use of the rocks on the site as cladding material could be considered for new buildings.
- Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. The local material such as the rocks found within the area could be applied to the stormwater runoff from the road to prevent erosion.
- Infrastructure improvement including new roads, and upgrades to the road network should be appropriate to the rural context (scale, material etc.). Out of scale development should be avoided, as they detract from the rural character of the cultural landscape;
- The layout of the turbines should have an emphasis on place-making, i.e. landscape-related heritage considerations, as opposed to standard infrastructure driven requirements;
- Prevent construction of new buildings/structures on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. Retain the integrity of the distinctive and predominantly agricultural landscape character;
- Scale and massing should be sensitive to the surrounding agricultural landscape.

Historic Criteria

- Names of routes and water courses that refer to traditional use during the time of the hunter-gatherers and herders of the Cape should be celebrated. Public access to these sites should be encouraged, and care should be taken to protect these names.
- Traditional planting patterns (here the clusters of Eucalyptus trees) should be protected by ensuring that existing tree alignments and copses are not needlessly destroyed, but replaced (with appropriate indigenous species), thereby enhancing traditional patterns while increasing biodiversity.
- In some cases, remnant planting patterns (even single trees) uphold the historic character of an area. Interpretation of these landscape features as historic remnants should occur.
- Where the historic function of a building is still intact, the function has heritage value and should be protected.
- Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place.
- The relocation of farm employees to housing settlements can result in loss of heritage value (authenticity) for workers houses and associated features.

Social Criteria

- Where workers cottages are still in use they should be protected for that function, and not be replaced serving an alternative function. Individuals living in this area foster special connections to place.
- Care should be taken that existing functions such as the school are not lost in the development stages, as it fulfils an important function within the cultural landscape.
- The local community around the development should benefit from job opportunities created by the proposed development;

Economic Criteria

- Agricultural activities should continue underneath the wind turbines, or rehabilitated to increase biodiversity in the area.
- The predominant agricultural activities contribute to the distinctive character of the landscape in the broader context. These are linked to the wheat and canola fields with their characteristic patterns.

➢ A pre-construction walkdown of the final authorised layout including the powerline route must be conducted by an archaeologist to identify any areas requiring targeted mitigation in the form of excavation or removal of heritage resources. A walkdown report detailing the findings of the walkdown and the final layout must be submitted to HWC.

➢ Should any previously undocumented heritage resources be identified during the course of the construction, operation or decommissioning of the project, work must cease in the area of the find and HWC must be contacted regarding a way forward.

➢ The HWC Chance Fossil Finds Procedure must be implemented for the duration of construction activities

8.6.3 Conclusion

Based on the desktop assessment completed for this project, it was anticipated that the development would likely negatively impact on archaeology, palaeontology and cultural landscape heritage resources.

Based on the assessment completed, the area proposed for development has a low archaeological sensitivity. Very little archaeology was identified during the field assessment. None of the resources identified on-site will be negatively impacted by the proposed development in the layout provided in July 2021.

In terms of impacts to palaeontological heritage, the field survey conducted as well as several previous palaeontological field assessments in the region indicate that in practice the bedrocks and superficial sediments represented here are of Low Palaeosensitivity.

While the cultural landscape assessment noted that it is unlikely that the historic core of Swellendam would be negatively impacted by the development, significant cultural landscape resources that could be impacted include the N2 Scenic Route, the farm werfs located within the development area. Various mitigation measures are proposed to mitigate the impact anticipated to the cultural landscape, all of which are largely accommodated within the layout for the WEF.

There is no objection to the proposed development on heritage grounds on condition that the final authorised layout is subject to a walkdown by an archaeologist, and all mitigation measures are followed.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a Heritage perspective, **provided the appropriate mitigation measures are followed.**

For the full Specialist report please refer to Appendix D.

8.7 NOISE IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed dBAcoustics C/O Barend J B van der Merwe to undertake the Noise Impact Assessments for the Western Cape WEF.

8.7.1 Receiving Environment

The district where the proposed wind turbines will be located will be in the vicinity of farmhouses, R319, N2 and a gravel road with a continuous to intermittent flow of traffic during the day and the night-time respectively. This is an agriculture type zone with live-stock and seasonal crop farming. The prevailing ambient noise level increase during the planting and sowing periods. The wind contributes to the increased ambient noise levels when the wind blow. The wind noise during a wind of 5.6m/s was 53.6dBA and when there was slight breeze of 0.3m/s the prevailing ambient noise level was 32.6dBA. There will be a fluctuation of the prevailing ambient noise level when there is a change in the wind speed. The prevailing noise level at the farmhouses were higher than the noise levels some distance from the farmhouses due to activities at the farmhouses.

Noise Sensitivity – Potential Noise-sensitivity Receptors

There are a number of structures located within 2,000m from the proposed WTG, with the only structure used for residential purposes located further than 1,000 m from the proposed wind turbines. The farmhouses within and in the vicinity of the WEF footprint are indicated as noise receptors in Figure 8.11.

8.7.2 Potential Impacts Identified

The noise survey was conducted in terms of the provisions of the Western Cape Noise Control Regulations, 2013 and the SANS 10103 of 2008 (The measurement and rating of environmental noise with respect to annoyance and to speech communication).

The measuring points for the study area were selected to be representative of the prevailing ambient noise levels for the study area and include all the noise sources such as distant traffic noise, agricultural activities but exclude traffic noise which was intermittent in the vicinity of the measuring points at the time. 19 measuring points on and surrounding the Western Cape WEF Site were assessed. The resulting Noise contours and noise receptors are indicated in Figure 8.11.

The noise level from the proposed “new” wind turbines will be 106.4dBA at a height of 119m. There will be a shift in the prevailing ambient noise level in the immediate vicinity of the wind turbines but at a distance exceeding 400m from the wind turbine the intrusion level will be minimal and in line with the Western Cape Noise Control Regulations, 2013.

All the residential properties are situated outside this buffer zone and the recommended noise level of 45.0dBA at the residential properties for the area outside the buffer zone will be adhered to with the implementation of the noise mitigatory measures

The prevailing ambient noise levels are largely created by emissions from a combination of noise sources of which the main source is wind noise, and the wind turbines can only operate when the wind is blowing. The large variations in the meteorological conditions and the geographical relations between the wind turbine positions and the noise sensitive receptors allow for the decrease in the noise as it propagates from the wind turbines.

The potential noise impacts identified are listed below:

Construction phase.

- Noise from grading and building of new roads
- Noise from the preparation of the footprint, earthworks, and construction of the base of the wind turbine
- Noise from the construction of the wind turbines – off loading of blades, generator, and mast.
- Noise from construction vehicles and traffic to and from the wind turbine construction sites.

Operational phase.

- Noise generated by the wind turbines.
- Noise from mechanical noise generated by the gearbox and generator (nacelle) which is situated at 119m from ground level.
- Noise from normal wear and tear of the essential components such as gear-box, generator and blades.
- Noise from amplitude modulation.
- Noise from traffic to and from the wind turbine sites.
- Noise from sub-station and overhead power lines.
- Noise from cyclic and/or emergency maintenance activities.

Decommissioning phase.

- Noise from removal of wind turbines and the rehabilitation of the wind turbine sites.

From the data presented by the independent noise specialist, the noise impacts of the proposed WEF on surrounding noise receptors appear to be low.

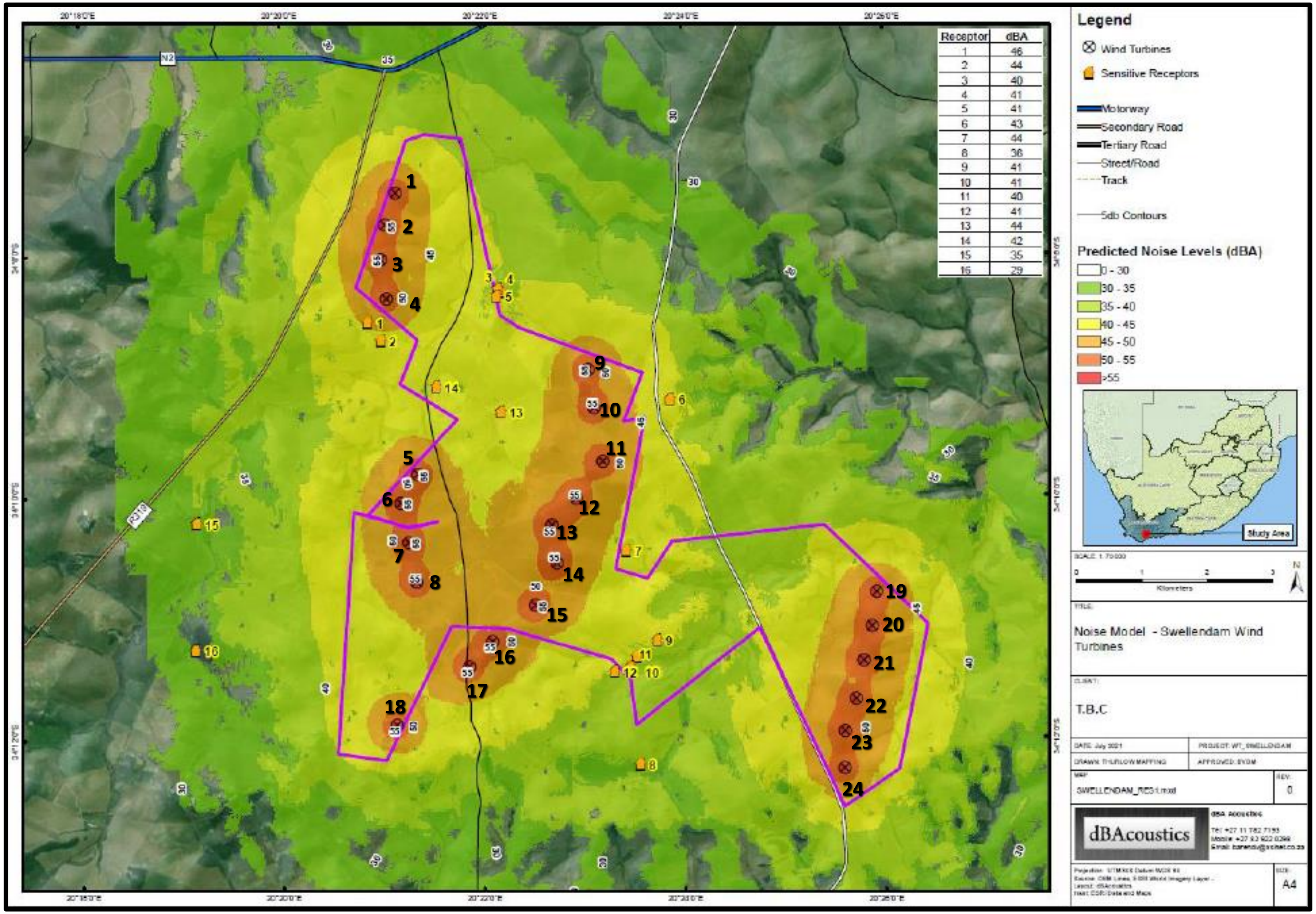


Figure 8.11: Noise Sensitivity Map indicating the Noise contours and noise receptors for the proposed Western Cape WEF.

Mitigation

The following conditions will be applicable on the authorisation of this project:

- Construction staff must be trained to minimise noise impacts;
- The holder of the authorisation must ensure that the Western Cape Noise Control Regulations, 2013 and SANS 10103:2008 are adhered to and reasonable measures to limit noise from the work site are implemented;
- The responsible person at the wind farm site during the construction phase must ensure that the construction staff working in areas where the 8-hour ambient noise levels exceed 75.0dBAmust wear ear protection devices;
- The (contractor) holder of the authorisation must ensure that all equipment and machinery are well maintained and equipped with silencers;
- The (contractor) holder of the authorisation must provide a warning to the community when noisy activity e.g. blasting is to take place;
- All noisy construction operations should only occur during daylight hours;
- All wind turbines must be located at a setback distance of 500m from any homestead and a day/night noise criteria level at the nearest residents of 45.0dBA should be used to locate the turbines. The 500m setback distance can be relaxed if local factors; such as high ground between the noise source and the receiver, indicates that a noise disturbance will not occur;
- Positions of turbines jeopardizing compliance with accepted noise levels should be revised during the micro-siting of the units in question and predicted noise levels re-modelled by the noise specialist to ensure that the predicted noise levels are less than 45.0dBA.
- Design and implement a noise monitoring programme, as indicated below:

Noise Monitoring Programme

Pre-construction phase

- Measuring points to be registered along the boundary of the wind farm, noise sensitive area and at each wind turbine site.
- Twice annual noise monitoring during construction period by an Acoustic Consultant or Approved Noise Inspection Authority, during the winter and the summer periods, with all information to be kept on record.

Construction phase

- Twice annual noise monitoring during construction period by an Acoustic Consultant or Approved Noise Inspection Authority, during the winter and the summer periods, with all information to be kept on record.

Operational phase

- Monthly noise monitoring conducted by an Acoustic Consultant or Approved Noise Inspection must commence as soon as the Wind Energy Facility becomes operational.
- As soon as the noise monitoring results are stable, the requency of monitoring can be reduced to quarterly noise surveys.
- The following noise results must be kept on record:

- Leq – values of each measuring point in dBA;
- Spectrum analysis of the results;
- Any physical characteristics in and next to the measuring points which may change the noise regime of the area;
- Any other details such as the instrument, competent person etc. will be compiled and made available.

8.7.3 Conclusion

Due to the nature of the proposed development, there will be an increase in the prevailing ambient noise levels within the vicinity of the wind turbines. All the residential properties are situated outside this buffer zone and the recommended noise level of 45.0dBA at the residential properties for the area outside the buffer zone will be adhered to with the implementation of the noise mitigatory measures.

The threshold value of 7.0dBA (Western Cape Noise Control Regulations, 2013) will not be exceeded during the day and/or night- time periods based on a recommended noise level of 45.0dBA by the DEA. The proposed WEF is supported, and the authorisation thereof can be granted from an environmental noise point of view.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a noise perspective.

For the full specialist report please refer to Appendix D.

8.8 SOCIO-ECONOMIC IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Multipurpose Business Solutions C/O Dr Jonathan Bloom to undertake a Socio-Economic Impact Assessment for the proposed Western Cape WEF.

8.8.1 Receiving Environment and Agricultural Sensitivity

The site proposed for the Western Cape WEF is located in a rural area where the predominant farming activity is sheep and grain cultivation. The town of Swellendam (within the Swellendam Municipality) is located within a radius of 40 km from the proposed site for the WEF, whereas the towns of Bredasdorp and Riviersonderend (also in the Swellendam Municipality) and Bonnievale (Langeberg Municipality) are located within 50 km of the proposed site. The Marloth Nature Reserve, San bona Wildlife Reserve and Bontebok National Park are three nature reserves found within the vicinity of Swellendam, with the De Hoop Nature reserve about 40-50 km from the proposed WEF.

Swellendam, one of the oldest settlements in South Africa, is famous for its architecture and history. In terms of the town’s potential, it is classified as “Town Investment with a low human need and above-average development potential”. The town has a good infrastructure and is considered as a town with tourism as an economic base and an agriculture service centre for the area. It also has a rich natural and cultural heritage.

Socio-demographic profile of the study area population

An analysis based on the specified concentric zones suggests that 60,39% of the population residing in the area (i.e. within 40 km of the proposed site) live within 20 km of the site proposed for development. An assessment based on the population groups suggests that 63,80% of the population that resided within 20 km of the site are Coloured, 19,24% are White and 1,60% are Black African. Within the 40 km zone, 69,16% of the total population in 2011 were Coloured, 17,01% are White and 1,11% are Black African residents. (See **Table 8.2**)

Analysis of education levels
An analysis of education levels in the study area for 2011 is Summarised in **Table 8.3**. The results indicate that 4,90% of persons living within 20 km of the site had no schooling (including those under the school-age), whereas 5,36% of the population within 40 km of the site had no schooling in 2011. The assessment further suggests that 87,07% of persons living within 20 km of the site received Grade 1 to Grade 12 schooling, whereas 8,02% obtained Matric with a higher diploma or degree qualification.

Analysis of age levels
An analysis of the age levels among the population within 20 km and 40 km is intended to indicate the population that could be considered economically active, i.e. persons between the ages of 19 and 65.

The assessment indicates that 25,36% and 26,40% of the population within 20 km (See **Table 8.2**) and 40 km of the development site were below 15 years of age, respectively. Our analysis also suggests that 66,72% of the population within 20 km from the site were in the working-age category (14 to 65 years of age), while the working group within 40 km of the site represented 66,67% of the total population. The assessment indicates that every two persons who would normally be considered economically active could support another person that was not economically active within 40 km of the site.

Analysis of household income levels

Table 8.3 provides the income ranges for households as defined by the specified 20 km and 40 km radii from the centre of the proposed WEF. Note that not all the respondents disclosed their income. Of those that did disclose their income, 10,62% of the households residing within 20 km of the proposed development had no income, and 59,82% earned less than R76 801 per annum (excluding households with no income). Within 40 km of the development, 8,33% of the households did not have an income, 65,12% of the households had an annual income of less than R76 801, whereas 1,62% of households declared an income of more than R614 400 per annum.

Employment and skills level analysis

A perspective of employment for the different zones is provided in **Table 8.2** with specific reference to the number of employed, unemployed and not-economically active persons per population group. The analysis indicates that 50,52% of the total population residing within 20 km of the site were employed, while 54,75% within 40 km were employed. The proportion of employed for the Black African, Coloured and White groups were 52,87%, 52,81% and 64,40% of the total population group within 40 km, respectively.

An assessment of the dependency ratios for the zones is based on the premise that for each person who was
employed, a factor of people was unemployed or economically inactive. The findings of the research for each of the zones suggest a dependency ratio of 1,02 and 1.21 for the total population within 20 km and 40 km, respectively. This implies that every employed resident had to support one unemployed or economically inactive person. The dependency ratio for both the Coloured and Black African population groups within 40 km of the site was 1,12.

Fit with spatial planning

The Swellendam Spatial Development Framework and Integrated Development Plan are the primary planning tools for the local areas as it incorporates the provisions of all other broader level plans for the area and therefore forms the initial basis for the socio-economic assessment of the proposed Western Cape WEF. The proposed project is positioned as a development that is intended to contribute towards electricity provision in the Swellendam area, where the community needs private investment to uplift their socio-economic well-being and create more sustainable employment.

The proposed Western Cape WEF is aligned with general national, provincial and local planning objectives. Of particular importance is the proposed location within the Overberg REDZ that has been earmarked for renewable energy projects. It is clear from both National and Provincial legislation, policies, strategies and action programmes that targets have been set to achieve a greater energy output from renewable energy sources. There is growing pressure on the stable and reliable provision of electricity generation throughout the country, and Eskom's inability to guarantee constant supply requires investment in alternative and renewable energy sources.

A key factor in the feasibility assessment of a WEF is the tariff that NERSA is prepared to pay for the electricity generated by the operator of the PV Plant. The large capital outlay for the turbines and the direct and indirect infrastructure can only be justified by the tariff obtained for the electricity and consequently the minimum required return for the investors in the project. An agreement is concluded with the landowner to lease a portion of the farm for a period that equates to the economic life of the WEF.

Table 8.2: Demographic Summary Table for the Population living within 20km of the proposed Western Cape WEF Site, indicating the breakdown of Race, Age and Employment Status.

		Black African	**Coloured Indian/**	**Asian**	**White**	**Other**	**Total**	**Percentage**
Age category	0-14	695	3870	19	536	50	5170	25,36
	15-24	698	2458	11	325	75	3568	17,50
	25-34	794	1838	9	412	118	3171	15,56
	35-44	446	1798	7	493	43	2788	13,68
	45-54	231	1632	5	592	17	2477	12,15
	55-64	147	882	3	547	14	1593	7,82
	65-120	65	522	2	1019	9	1617	7,93
	Total	3076	13001	56	3924	326	20383	100
	Percentage	15,09	63,78	0,27	19,25	1,60	100	
Category of employment	Employed	1099	4062	22	1527	140	6850	50,52
	Unemployed	382	433	0	23	17	855	6,31
	Not economically active	837	4116	12	779	110	5854	43,17
	Total	2318	8612	35	2329	266	13559	100
	Percentage	17,10	63,52	0,26	17,18	1,96	100	
	Dependency ratio per population group	0,9	0,89	1,8	1,9	1,11	1,02	

Table 8.3: Demographic Summary Table for the Population living within 20km and 40km of the proposed Western Cape WEF Site, indicating the breakdown of Gender, Education Level and Income.

		Within 20km	Percentage	Within 40km	Percentage
Gender	Male	10042	49,27	16846	49,91
	Female	10341	50,73	16909	50,09
	Total	20383	100	33755	100
Education category	No schooling	876	4,90	1595	5,36
	Some primary	5323	29,78	9729	32,67
	Completed primary	1267	7,09	2409	8,09
	Some secondary	5712	31,96	9407	31,59
	Grade 12/Std 10	3260	18,24	4591	15,42
	Higher	1434	8,02	2051	6,89
	Total	17872	100	29782	100
Income category	No income	631	10,62	790	8,33
	R1 - R4 800	92	1,55	126	1,33
	R4 801 - R9 600	226	3,80	314	3,31
	R9 601 - R19 200	840	14,14	1410	14,87
	R19 201 - R38 400	1294	21,78	2447	25,81
	R38 401 - R76 800	1102	18,55	1877	19,80
	R76 801 - R153 600	838	14,11	1194	12,60
	R153 601 - R307 200	531	8,94	754	7,95
	R307 201 - R614 400	288	4,85	415	4,38
	R614 401 - R1 228 800	60	1,01	93	0,98
	R1 228 801 - R2 457 600	18	0,30	31	0,33
	R2457 601 and more	21	0,35	30	0,32
	Grand Total	5941	100	9479	100

8.8.2 Potential Impact Identified

Potential positive impacts

A number of benefits are associated with the proposed Western Cape WEF:

- Once operational, the proposed WEF would **produce 140 MW of renewable energy**, which can be delivered either to Eskom or in terms of Government gazetted changes that will now allow municipalities to generate their own electricity. Only municipalities in good financial standing will be permitted to partake in the programme. Combined with other renewable energy facilities in the area, it could render the local economy less dependent on expensive electricity provided by Eskom according to the Municipal IDP (2021).

- **Job creation:** Between 277 and 339 direct and indirect job opportunities would be associated with the WEF during the construction phase. It is estimated that 249 and 305 jobs could be associated with the installation of the wind turbines, while 28 to 34 direct and indirect jobs are related to the provision of the infrastructure required for the installation of the wind turbines. An analysis of the direct employment opportunities during operations indicates that 37 to 45 permanent jobs could be created based on the lower and upper bounds. This would include 34 to 41 skilled or highly skilled persons would be required regularly during the operational phase of the project's economic life.

- **Contribution towards economic income**: During the construction phase (at a lower bound cost of R52.2 million per MW installed), a combined initial investment of R1 021.1 million (R209.3 million net of the initial import leakage) could give rise to a multiplied increase in GVA of R229.9 million in the Swellendam Municipal area over 36 months (at current prices). Furthermore, an additional R262.8 million of indirect value-added will be generated due to the procurement of goods and services from businesses located within and the spending of wages and salaries in the Western Cape Province. If an upper bound cost of R63.8 million per MW installed is used, a combined initial investment of R1 247.9 million (R255.8 million net of the initial import leakage) will give rise to a multiplied increase in GVA of R281.0 million in the Swellendam Municipal area over months (at current prices). Furthermore, an additional R321.2 million of indirect value-added will be generated due to the procurement of goods and services from businesses located within and the spending of wages and salaries in the Western Cape Province.

- In terms of **direct spending** over 20 years envisaged for the useful life of the WEF, almost R338.5 million of direct spend could accrue to local suppliers in nominal terms based on an upper bound and 50% of local content. Due to the backward and inter-sectoral linkages, a further R67.3 million could be generated for the Swellendam economy due to the original direct operational spend. The multiplied increase in GVA for the Swellendam economy using the lower bound and 30% local content is estimated at R199.2 million in nominal terms. A 30% take-up of local content suggests a multiplied increase in GVA for the Swellendam economy of R243.5 million based on the upper bound.

- **Revenue for local authorities**: Based on an assumed value of R193.6 million for the existing land portions, and the application of the appropriate tariff suggests an income for the Swellendam Municipality of R464 772 in the first year based on the estimated size of the land portion earmarked for the WEF, which is to be confirmed. If one assumes an escalation of 6% per annum over 20 years, a total income (escalated – nominal terms) of R17 096 913 would accrue to the Swellendam Municipality, or R855 000 per annum, on average over 20 years. The fiscal revenue for the Municipality would not be the driving force behind an endorsement of the WEF, but rather the sustainability of energy provision for the area and the need to foster economic growth. The opportunity to participate in the decentralisation of energy production to the local level and the procurement from IPPs by municipalities would also be a key factor going forward.

- **Real estate values of surrounding land:** Since the area has been identified for Renewable Energy development (Overberg REDZ), there may be a demand for the development of land parcels for other renewable energy projects and this may result in an increase in perceived property value of surrounding farm land.

- **Education and training opportunities:** A WEF can provide education and training opportunities to local residents and learners. Additional renewable energy facilities in the area may support the establishment of a "Green Energy Route" highlighting the technology and benefits of wind and solar energy. This will expose learners to various forms of renewable energy generation and highlight various occupations associated with renewable energy projects.

Potential negative impacts

The following potential negative impacts have been identified:

- **Sense of place**: The wind turbines will impact the sense of place in terms of the rural character and scenic views (see Visual Impact Assessment).

- **Dust and noise**: The impact will be low due to a lack of receptors near the construction sites.

- **Influx of job-seekers:** Between 277 and 339 direct and indirect employment opportunities would be related to the construction phase of 2 to 3 years for the WEF, but the highly technical nature of the construction activities would likely discourage casual labourers.

- **Increase in crime levels**: Construction activities could have an impact on crime levels in the area, but this could be mitigated with effective security measures and access control.

- **Human health** and well-being: Large wind turbines may cause a low level of noise and shadow flickering that could affect sensitive individuals.

Cumulative impacts

Cumulative impacts refer to other development(s) as well as existing activities within the immediate area that could compound any positive or negative impacts associated with the proposed development. The potential negative impacts would be compounded if additional developments were introduced in the immediate and surrounding areas. These impacts would typically relate to a sense of place, influx, traffic, crime and nuisance factors. However, several developments in the Swellendam area could also compound the positive impacts, such as new employment, economic income and business development. To our knowledge, there is one operational (Excelsior) and two approved/proposed WEF developments within 30 km of the proposed Western Cape WEF site. The benefits of several renewable energy projects will also be compounded, especially with regard to skills development in a sector that is still in its infancy in South Africa. The contribution toward economic income and local authorities could provide a catalyst for further economic development, whilst a compounded demand for goods and supplies could provide new business opportunities, especially for industries associated with the Overberg REDZ.

Mitigation measures

Construction phase

- Mitigation measures indicated by the Traffic, Agricultural, Heritage and Visual Specialists must be implemented.

- Dust and noise emissions during the construction period should be minimised by employing a Construction Environmental Management Plan (CEMP). For example, site construction roads and excavated materials should be sprayed with an eco-friendly dust suppression liquid during dry periods to mitigate the formation of dry dust particles.

- Local people skilled in earth moving and building activities can be employed during the construction phase, whilst cleaning, security and maintenance services during operations could employ low- or semi-skilled workers. In the event of a shortage of labour from the Swellendam area, the developer should undertake to employ contractors from other areas of the Overberg. The Developer should consider this as one of the pre-qualification requirements for tendering.

- Co-operation between the Developer and contractors is essential to ensure that the area around the proposed development remains secured during construction.
    - The site will be fenced and patrolled 24/7.
    - Increase in local crime On-site security measures, such as perimeter fencing, controlled access and security guards and patrols will minimise the risk.

<u>Operational phase</u>

- Mitigation measures indicated by the Traffic, Agricultural, Heritage and Visual Specialists must be implemented.

- Implementation of modern technology to ensure that noise levels are reduced, as well as the placing of turbines more than 400 m from any residential dwelling

- Dust and noise emissions during the construction period should be minimised through a Construction Environmental Management Plan (CEMP) for the development that would include measures and trigger mechanisms to mitigate any potential impacts to nearby receptors. For example, site construction roads and excavated materials should be sprayed with an eco-friendly dust suppression liquid during dry periods to mitigate the formation of dry dust particles.

Recommendations

- Guidelines should be prepared for the implementation of a Procurement Strategy that includes the following:
  - Initiate the procurement strategy during the first phase of the project after which the implementation of the strategy becomes the responsibility of the contractor(s) collectively under the guidance of the developer.
  - Develop a database of local contractors who are competitive and possess the required skills and capacity to obtain contracts.
  - Local contractors should be invited to tender for work in the context of the terms and conditions that should be included in Request for Proposal documentation.
  - A requirement for the preparation of a Procurement Strategy should be included in the Conditions of Approval

- A Communication Strategy should be prepared to inform locals about opportunities together with the terms and conditions applicable to procurement and employment.

- Monitoring and Evaluation should form part of assessing any socio-economic benefits that may accrue to locals and other beneficiaries in terms of the recommendations stated herein.

8.8.3 Conclusion

The Western Cape WEF in the Swellendam Municipality is supported on condition that the recommendations/ mitigation measures included in this report are implemented. In addition, the recommended enhancement and mitigation measures contained in other specialist reports and those required to support mitigation of several impacts identified and assessed in the Socio-economic Impact Assessment report should be implemented.

It is also essential that business opportunities for local residents be considered as part of construction procurement processes. Sub-contracting and outsourcing opportunities from businesses that have the necessary skills are essential to enhance socio-economic development and offer greater business sustainability.

Monitoring and evaluation of the project are necessary for the successful measurement and tracking of the impacts associated with the construction and operations phases.

In conclusion, we have not identified, at this stage, any fatal flaws related to any of the socio-economic impacts assessed in this report.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a Socio-Economic perspective, **provided all mitigation measures are adhered to.**

8.9 TRAFFIC IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Innovative Transport Solutions C/O C. Krogscheepers, P. Arangie & T. Neels to undertake the Traffic Impact Assessments for the Western Cape WEF.

8.9.1 Receiving Environment

The Wind Energy Facility is located 15 kilometres to the southwest of the town Swellendam, to the south of the N2 and to the east of the R319 in the Western Cape. The site is also located within the Renewable Energy Development Zone (Overberg REDZ).

Existing Roadways

Roads included in this study are the National Road N2, the R319 and other Provincial roads in the site vicinity. The existing roadway characteristics are summarised in **Table 8.4.**

Table 8.4: Existing Roadway Facilities

Roadway	Type of Road	Posted Speed (km/h)	Road Surface
N2	*National Road*	*120*	*Paved/Tar*
R319 (MR00264)	*Provincial Main Road*	*100*	*Paved/Tar*
MR00268	*Provincial Main Road*	*Not posted Assumed 80*	*Gravel*
DR01251	*Provincial Divisional Road*	*Not posted Assumed 60*	*Gravel*

Existing Cross Sections and Surface Conditions

In the vicinity of the proposed development, the N2 has a typical rural formation of a National Road, paved with one lane per direction of travel with paved shoulders along both sides of the road. The lanes are 3.7m wide with 2m wide shoulders. The typical cross section for the R319 is 3.4m wide lanes with gravel shoulders. All paved (tarred) roads in the site vicinity have good surface conditions. MR00268 is an 8-metre-wide gravel road and the gravel surface is in fair condition with some poor sections. DR01251 is a 6-metre-wide gravel road and the gravel surface is in poor condition.

The typical cross-section of the roads in the site vicinity can be found in the Specialist's report (Appendix D).

Existing Traffic Volumes

The existing traffic conditions are based on the traffic volumes extracted from the SANRAL Comprehensive Traffic Observation (CTO) Stations and Provincial count stations in the area. The table below illustrates the current annual average daily traffic volumes (AADT), the annual daily truck traffic volumes and the peak hour volumes on the road network in the wind farm site vicinity.

Table 8.5: Traffic Volumes

Road	*AADT*	*ADTT*	*Peak Hour Volume*	*% Heavy Vehicles*
N2	*3835*	*557*	*342*	*15%*
R319 (MR00264)	*830*	*122*	*67*	*15%*
MR00268	*598*	*51*	*66*	*8%*
DR01251	*124*	*18*	*15*	*15%*

The existing traffic volumes along the surrounding road network are low and the existing traffic volumes will not be any reason for concern in terms of the expected transport impact associated with the proposed development.

<u>Site Accesses</u>

Construction access to the wind turbine locations will be via existing and new accesses roads off the Provincial roads in the site vicinity. The available shoulder sight distances (SSD) along the public roads from the different access positions is sufficient.

<u>Transport Route</u>

Based on the abnormal load requirements, preliminary routes are proposed for transporting the large equipment from the Saldanha or Cape Town harbours to the site. The Saldanha route follows the R45 and then the R311 to Moorreesburg, then the R311 to Riebeeck Kasteel and the R46 via Hermon and Wolseley to the N1 at Worcester, then via the R60 to Swellendam and then via the N2 to the site. The Cape Town route follows the R27 to Melkbosstrand and then the via the Melkbosstrand Road to the N1, then via the N1 to Moorreesburg, then follows the same route as from Saldanha Bay harbour.

8.9.2 Potential Impacts Identified

The expected effects of traffic that would be generated by the proposed development during peak hours were analysed as follows:

- The **background traffic** volumes were determined for the study network in the vicinity of the site. These are the traffic volumes that would be on the road network in the absence of the proposed development (No go Alternative);
- A growth factor was applied to account for regional growth
- Construction Phase Traffic
- **Site-generated trips** were estimated for the proposed development;
- The construction phase traffic and the assigned site-generated traffic from the proposed development were added to the **background traffic** volumes to determine the **total traffic** conditions during the construction and operational phases

Year 2026 Background Traffic Conditions

For the purposes of this study, year 2026 background traffic volumes were developed by applying a 3.0 *percent annual traffic growth rate* to the existing traffic volumes on the major links. This estimated growth rate was assumed to allow for the additional traffic volumes that will be generated by other in-process and future developments in the vicinity of the proposed development.

Due to the low traffic volumes along the surrounding road network, it is expected that the road network will continue to operate at acceptable levels-of-service during the background conditions. The roads in the site vicinity are in a fair condition and no major maintenance will be required in the near future.

Construction Phase Impacts

A large amount of traffic will be generated during the construction phase. The following activities will probably occur during the construction phase:

- Construction of the internal access roads.
- Stripping and stockpiling of topsoil.
- Excavation and construction of the foundations for the wind turbines.
- Construction of the operations building.
- Erection/Assembly and disassembly of the cranes.
- Assembly of the towers, nacelles and blades.
- Trenching for cabling.
- Reinstatement of the site.

The internal access roads to the two turbines will be constructed mainly of local materials sourced on site if the material is suitable, otherwise material will be imported from commercial sites. These roads will be retained and used for inspection and maintenance of the wind turbines.

The tower foundations are large reinforced concrete footings. It is assumed that the material removed during excavation will be utilised within the site to create hardstand areas for the cranes and in reinstating the site after construction. It is assumed that the concrete will be mixed on site and the raw materials will be transported to the site via the existing road network. It is assumed that up to 75 truckloads will be required for each foundation.

Approximately 100 heavy truck loads are required on site to assemble and disassemble the cranes. The components of the wind turbines will be transported to the site from Saldanha or Cape Town harbours and approximately 12 abnormal truck loads are required per wind turbine.

Proposed Road Network Upgrades

Based on the expected number of construction trips generated by the proposed development the existing road network has sufficient capacity to accommodate the additional trips from an operational perspective. During construction it is expected that road surfaces of the gravel roads might require maintenance to prevent damage to the road structure.

Once construction is completed the Provincial roads should be inspected and repaired where necessary.

Operational Phase Impacts

The operational phase of this project is not expected to generate significant traffic volumes. The typical day-to-day activities will probably only be service vehicles undertaking general maintenance at the site. The number of permanent staff on site is not expected to be more than 40 people and therefore no additional upgrades are required to accommodate the operational site traffic.

Mitigation Measures

One of the turbine positions is right next to DR01251, which is a public road. It is recommended that this turbine be moved 80 metres to the east to clear any possible impact the turbine can have on traffic along DR01251.

Construction Phase

- These measures will be included in the Transport Management Plan
    - Abnormal and heavy load vehicles should not be allowed on the public road network during the typical weekday a.m. and p.m. peak hours.
    - Abnormal load vehicles should be escorted by traffic officials to control traffic and limit possible conflicts at intersections.
- Resurfacing of sections along MR00268 and DR01251, where required and regular road maintenance i.e. grading of the road once every two weeks during the construction phase.
- The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.

Operational Phase

- Routine road maintenance by the relevant Roads Authority.

Decommissioning Phase

- Resurfacing of sections along MR00268 and DR01251, where required and regular road maintenance i.e. grading of the road once every two weeks during the decommissioning phase.
- The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.

8.9.3 Conclusion

The current demand on the existing road network in the site vicinity is low and the road network and intersections operate at acceptable levels of service.

Based on the expected number of construction trips generated by the proposed development
the existing road network has sufficient capacity to accommodate the additional trips from an operational perspective. During construction it is expected that road surfaces of the gravel roads
might require maintenance to prevent damage to the road structure.

One of the turbine positions is right next to DR01251, which is a public road. It is recommended that this turbine be moved 80 metres to the east to clear any possible impact the turbine can have on traffic along DR01251.

The operational phase of this project is not expected to generate significant traffic volumes.

Based on the evaluation as discussed in this report the existing road network has sufficient spare capacity to accommodate the proposed Western Cape Wind Energy Facility without any road upgrades required to the existing road infrastructure. It is recommended that the proposed
Western Cape WEF be approved from a transport impact perspective.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a traffic perspective.

For the full Specialist report please refer to Appendix D.

8.10 VISUAL IMPACT ASSESSMENT

TMG, on behalf of the Applicant appointed Environmental Planning and Design C/O Jonathan Marshall to undertake the Visual Impact Assessments for the Western Cape WEF.

8.10.1 The Receiving Environment

<u>Landform</u>
The proposed site is located to the south and close to the base of the Langeberg mountain range which has an underlying geology comprised mainly of Table Mountain Sandstone. This landform provides a steep, dramatic backdrop to the area. It is also likely to limit visibility of the proposed WEF to the north of the proposed site.

The coastal plain at the base of the mountain range [….] has a steeply undulating landform. It generally falls from the base of the Langeberg over a distance of approximately 50km towards a coastal slope with a relatively even gradient. The proposed site is located on the broad coastal plain.

<u>Landcover</u>
Land cover can broadly be divided into three categories, including:

- **Agricultural** use which occurs over most of the Coastal Plain. This is comprised of a mix of arable and livestock rearing. This has created a large and open field pattern. There are also numerous small groups of agricultural buildings within this landscape that include homesteads, workers accommodation, storage areas and other agricultural structures. A number of agricultural homesteads particularly to the south of the site were noted as having tourism importance. Of particular note is Aloe Ridge which is located beside the Breede River
- **Natural and conservation / protected areas**. These occur largely on the upland areas of the Langeberg and on the Coastal Slopes. Much of these areas are protected as nature reserves. There are also small natural areas within the Coastal Plain. These largely take the form of patches and corridors of natural vegetation along water courses.
- **Settlement areas**, the most major of which is the town of Swellendam that is located approximately 11km to the north east of the proposed site area. Swellandam is a historic town with obvious heritage and tourism importance. There are also a number of tourism lodges in the area particularly adjacent to the Breede River.

In visual terms, general crop areas and grazing land has produced a relatively open landscape. Vegetation in and around settlements is likely to provide a large degree of screening within settlements.

Visual Sensitivity

Due to the undulating topography within the Coastal Plain to the south, only higher sections within the surrounding landscape are most likely to be affected and as the viewer travels further from the proposed site, the greater the screening ability of the landform within the coastal plain becomes.

The most critical visual receptors include:

Roads

Local roads in the area include:

- **The N2** which runs to the north of the proposed site is a strategic route that links Cape Town to coastal areas to the east. This route no doubt carries a high proportion of local traffic. Its prime importance however is as a strategic economic link with the rest of the country. This route has a high tourism importance.
- **The R319** which runs close to the western side of the proposed site. This road is a regional distributor linking the coast with the N2 and areas inland. It too has strategic importance and is no doubt used by a mix of traffic including local, regional commercial / business and tourism related traffic.
- **The R60** which links Swellendam to the town of Worcester which is inland and to the northwest of Swellendam. This road is also a regional distributor which is used by a mix of traffic including local, regional commercial / business and tourism related traffic.
- There are **several un-surfaced local roads** that both pass through and close to the site. To the east of the site are two linking roads that provide access to the coast and Breede River as well as the settlements of Malgas and Infanta. These areas have tourism importance as they include numerous riverside and coastal lodges / accommodation. The Breede River is also important for organised events and activities such as the Up The Creek Music Festival.

Protected Areas

- There are a number of protected areas within the Approximate Limit of Visibility (ALV). The most important protected area is the **Bontebok National Park** which is approximately 6.3km to the northeast of the proposed site. Within the **Bontebok National Park** there are a number of point receptors such as picnic sites, visitor accommodation and a viewing platform all of which are located within the Breede River Valley. Because of their elevation views towards the proposed site are blocked by valley slopes. However, there is also a view site at a higher level within the Park from which views towards the proposed site**.** It should be noted that direct views over the proposed site are not possible.

Settlements

- **The town of Swellendam,** which is one of the oldest towns in the Country. This town has both heritage and tourism importance. Any potential industrialisation of the outlook from the town could have negative implications. The town is located approximately 9km from the proposed site. It should be noted that the sections of the town closest to the proposed site are comprised largely of industrial elements including large scale silos and tanks.

- There are a number of **Local Farmsteads and Homesteads** located both within the proposed site and within the surrounding landscape. From the site visit it appears that the farmsteads within the proposed site have a primarily agricultural use. It also appears that homesteads with a recreation and tourism focus are largely located close to the Breede River. These are particularly sensitive to shadow flicker.

8.10.2 Potential Impacts Identified

The potential Visual Impacts can be summarised into three main Impact groups:

- **Change in the character of views**
- **Shadow flicker**
- **Lighting impact**

The magnitude of these impacts is directly related to the magnitude, as well as what falls within, their extent of visibility.

<u>Extent of Visibility</u>

Zones of Theoretical Visibility (ZTV) are defined as “a map, usually digitally produced, showing areas of land within which a development is theoretically visible”. Figure 8.12 indicates the relative ZTV of the proposed wind turbines for the Western Cape Wind Energy Facility.

<u>Visibility of Wind Turbines</u>

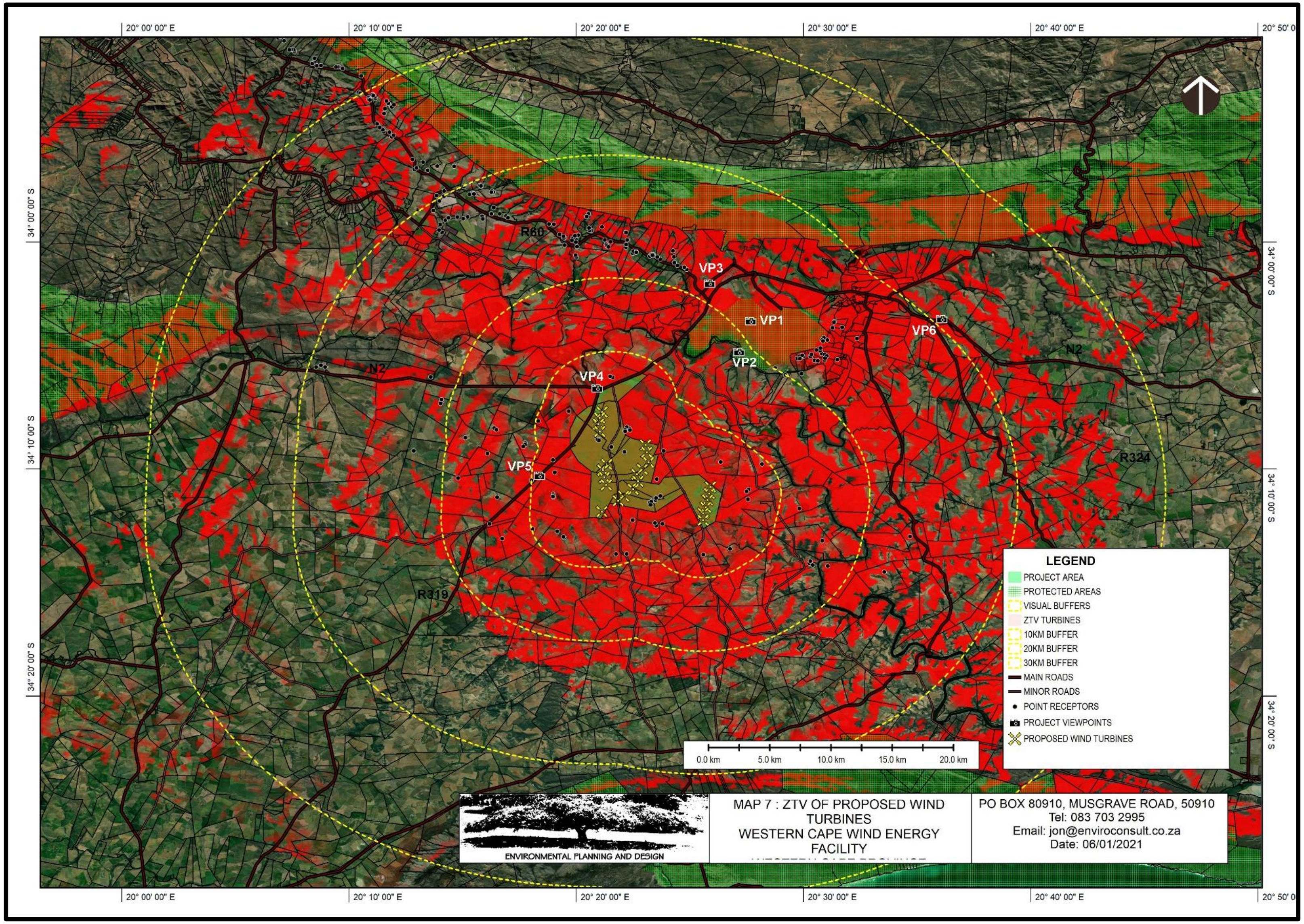
Visibility of turbines is likely to be limited to approximately 13km from the south, 27km to the east, 9.6km to the west and approximately 17km to the north.

Turbines will be visible from the **Langeberg** including protected areas. However these will be long distance views in excess of 10km with some in excess of 20km which means that they are only likely to be prominent in clear visibility or only visible in clear visibility respectively.

Turbines will be visible from the **Bontebok National Park**. Higher northern areas of the Park will generally be subject to long distance views in excess of 10km meaning that the turbines are only likely to be prominent in clear visibility. Views from lower, southern areas of the Park close to the Breede River will be mid distance views between 4km and 10km. From this area views of the turbines will be relatively prominent.

It should be noted that:

- While the majority of proposed turbines will be visible from upper areas of the Park, these will be seen in the context of formal agriculture and not a natural landscape; and
- From lower areas substantial screening of the proposed turbines will be provided by the steep landform to the south of the Breede River, with only the upper sections of three turbine rotors are likely to be visible from the selected viewpoint.



Energy Facility. Viewpoints are also indicated.

Visibility of Switching Substation

Due to the undulating topography, the limited height of the more solid elements and the relative transparency of higher elements, the switching Substation is likely to have relatively limited visibility.

The main area of impact is likely to be limited to a radius of approximately 1km from the substation. Outside this radius only partial views of the facility are likely to be possible:

- From approximately 2.4km of the N2
- From approximately 2.7km of the R319. From the closest section of this road, the impact is likely to be similar to views of the substation associated with the neighbouring Vreyheid WEF.
- The proposed substation may be visible from two homesteads one of which is within 1km and one within 3km of the proposed facility. Both buildings are on the edge of the ZTV and are surrounded by mature vegetation.

The Switching Substation will not be required should power line option 2 be used.

Visibility of Alternative On-Site Substations

Both alternative substations and associated Battery Energy Storage Systems are likely to have limited visibility, as summarised in Table 8.6 below.

Table 8.6: Table summarising the visibility of the two alternative on-site substation options for the Western Cape WEF.

Visual Receptor	Alternative Substation 1	Alternative Substation 2
R319 Road	Partially views intermittently over approximately 4km	Not Visible
N2 Road	Visible to approximately 100m of the road.	Visible to approximately 1km of the road.
Homesteads	Likely to be visible from five homesteads three of which are within 1.5km of the substation and two are likely to have partial views from a distance of approximately 4.5km	Likely to be visible from eight homesteads six of which are within 1.8km of the substation and two are likely to have partial views from a distance of approximately 2.5km

Visibility of Alternative 132kV Overhead Power Lines

Table 8.7: Table summarising the visibility of the two alternative Overhead Power Line options for the Western Cape WEF.

Visual Receptor	OHPL option 1	OHPL option 2
R319 Road	Likely to be visible to approximately 3km of the road.	Unlikely to be visible.
N2 Road	Outside the area of visual influence.	May be visible from approximately 3.7km of the road.
Homesteads	May be visible to eleven homesteads.	May be visible to thirteen homesteads.

In general terms Option 2 will be visible over a significantly smaller area than Option 1.

Option 2 also has the benefit that it feeds power into the grid via a loop in loop out connection into the existing Bacchus / Proteus 400kV power line thus negating the need for the proposed Switching Substation.

Cumulative Impacts

Cumulative impacts are likely to arise due to the presence of existing WEF projects in the area including the Vryheid WEF and the Excelsior WEF. The wind turbines, substations and overhead power lines are all likely to be obvious from the R319.

Cumulative impacts are therefore likely to affect the R319 as well as local roads and homesteads to the southwest of the proposed project.

Mitigation

Construction phase

- Twice annual noise monitoring during construction period by an Acoustic Consultant or Approved Noise Inspection Authority, during the winter and the summer periods, with all information to be kept on record.

Operational phase

- Use low key lighting around buildings and operational areas that is triggered only when people are present.
- Plan to utilise infra-red security systems or motion sensor triggered security lighting.
- Ensure that lighting is focused on the development with no light spillage outside the site; and
- Keep lighting low, no tall mast lighting should be used.
- Monitor homesteads for the effects of shadow flicker through regular discussion with residents over a minimum period of 12 months.
- Should shadow flicker be reported ensure that the turbine / turbines causing the shadow flicker is / are programmed to turn off during the periods when shadow flicker is reported.

Decommissioning Phase

- Ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.

8.10.3 Conclusion

The proposed project will be located within a Renewable Energy Development Zone (REDZ). REDZ have been planned by the DEA to ensure that renewable energy projects are focused in the most appropriate areas of the country. It is therefore to be expected that the landscape of these areas will change as projects are developed. This should also mean however that there is less pressure on un-suitable and perhaps more important landscape areas for development.

However, this should not mean that development should just be allowed to occur. The assessment has indicated that perhaps the most important receptors including the Bontebok National Park, the town of Swellendam and the N2 are likely to be subject to relatively low levels of impact.

The area of greatest concern relates to homesteads in the immediate vicinity of the proposed project. The majority of these are located on the affected properties. From the site visit it is understood that none of these include tourism related activities. In addition to industrialisation of views, they could however be subject to shadow flicker.

As long as mitigation measures are undertaken that will address these issues, there is no reason from a Landscape and Visual Impact why the proposed development should not proceed.

Based on the evidence before the EAP, it is clear that the **appointed specialist has not identified any fatal flaws** with the project proposal, and it is reasonable to suggest that the Western Cape WEF project is **acceptable and implementable** from a noise perspective.

For the full Specialist report, including further images from the viewpoints discussed, please refer to Appendix D.

9 PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ACTIVITY, SITE AND LOCATION WITHIN THE SITE

*In accordance with **Appendix 1 Regulation 3(h) (i, x and v); of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

***2(h)** – A full description of the process followed to reach the proposed development footprint within the approved site, including:*

***2(h) i** – Details of the alternatives considered*

***2(h) x**- If no alternatives, including alternatives location for the activity were investigates the motivation for not considering such*

***2 (h) v** –The impact and risks identified of each alternative including the nature, significance, consequence, extent, duration and probability of impacts including the degree to which these impacts-*

***(aa)**- can be reversed*

***(bb)** – May cause irreplaceable loss of resources; and*

***(cc)** – Can be avoided, managed or mitigated*

9.1 LEGISLATIVE REQUIREMENTS

The Western Cape Province NEMA EIA Guidelines (2013) on Alternatives require that a "*description of any feasible and reasonable alternatives identified*" must be provided and define alternatives as the following:

In terms of the NEMA EIA Regulations (2014, as amended) all BARs, Scoping Reports and Environmental Impact Reports must contain a description of any feasible and reasonable alternatives that have been identified, including a description and comparative assessment of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the community that may be affected by the activity.

Every EIA process must therefore identify and investigate alternatives, **with feasible and reasonable alternatives** to be comparatively assessed.

Alternatives are defined in the NEMA EIA Regulations as "*different means of meeting the general purpose and requirements of the activity*".

The "*feasibility*" and "*reasonability*" of and the need for alternatives must be determined by considering, *inter alia*, (a) the general purpose and requirements of the activity, (b) need and desirability, (c) opportunity costs, (d) the need to avoid negative impact altogether, (e) the need to minimise unavoidable negative impacts, (f) the need to maximise benefits, and (g) the need for equitable distributional consequences.

"***Alternatives***" in the context of an activity may include alternatives to:

- The "***property***" on which or location where it is proposed to undertake the activity;
- The type of "***activity"*** to be undertaken;
- The "***design or layout"*** of the activity;
- The "***technology"*** be used in the activity; and
- The "***operational"*** aspects of the activity.

The "No-Go" alternative must also be assessed.

An illustrative table is provided below, describing alternatives that are typically referred to during an EIA process, which are strongly influenced by the development opportunities and constraints identified during the process.

Table 9.1: Illustration of some typical alternatives assessed during an Environmental Application process.

TYPE OF ALTERNATIVE	EXPLANATION/EXAMPLES
Location	Refers to both alternative properties as well as alternative sites on the same property. **Note:** In terms of the Minimum Requirements for Waste Disposal by Landfill, location alternatives must considered during the EIA process.
Activity	Incineration of waste rather than disposal at a landfill site/ Provision of public transport rather than increasing the capacity of roads.
Design or Layout	Design: E.g. Different architectural and or engineering designs Site Layout: Consideration of different spatial configurations of an activity on a particular site (e.g. Siting of a noisy plant away from residences).
Technological	Consideration of such alternatives is to include the option of achieving the same goal by using a different method or process (e.g. 1000 megawatt of energy could be generated using a coal-fired power station or wind turbines.
Demand	Arises when a demand for a certain product or service can be met by some alternative means (e.g. the demand for electricity could be met by supplying more energy or using energy more efficiently by managing demand).
Input	Input alternatives are applicable to applications that may use different raw materials or energy sources in their process (e.g. Industry may consider using either high sulphur coal or natural gas as a fuel source).
Routing	Consideration of alternative routes generally applies to linear developments such as power line servitudes, transportation and pipeline routes.
Scheduling and Timing	Where a number of measures might play a part in an overall programme, but the order in which they are scheduled will contribute to the overall effectiveness of the end result.
Scale and Magnitude	Activities that can be broken down into smaller units and can be undertaken on different scales (e.g. for a housing development there could be the option 10, 15 or 20 housing units. Each of these alternatives may have different impacts).
"No-Go Option"	This is the option of not implementing the activity.

The NEMA Principles states that sustainable development requires the consideration of all relevant factors including the following:

- *That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
- *that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;*
- *that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;*
- *that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;*
- *that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;*
- *that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;*
- *that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and*
- *that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.*

Based on the available information the following feasible and reasonable alternatives for the Project have been identified and, in conjunction with reference to various specialist opinions have considered that the following alternatives, should be comparatively assessed, during the EIA Phase of the Project:

1. Property Alternative
2. Activity Alternative
3. Design or Layout Alternative
4. Technology Alternatives
5. Operational Alternative
6. The “No-Go” consideration (this is a mandatory option)

Based on the contextual information presented above, and described in detail below, there is no evidence to suggest that other alternatives should be investigated for the proposed activity.

9.1.1 The Property “Site” Alternative

No property or “site” alternative was assessed as part of the Report. During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed. **As such, no alternative sites were investigated for the purpose of this BAR**.

9.1.2 The "Activity" Alternative

During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed.

The expert assessments for the site did not find any reason to suggest that an activity alternative is required to be investigated. Based on the above, at this stage there is no reason to suggest that activity alternatives are investigated as these would not meet the general purpose and need of the proposed activity. **Therefore, no activity alternatives were investigated for the purpose of this BAR.**

9.1.3 The "Design or Layout" Alternative

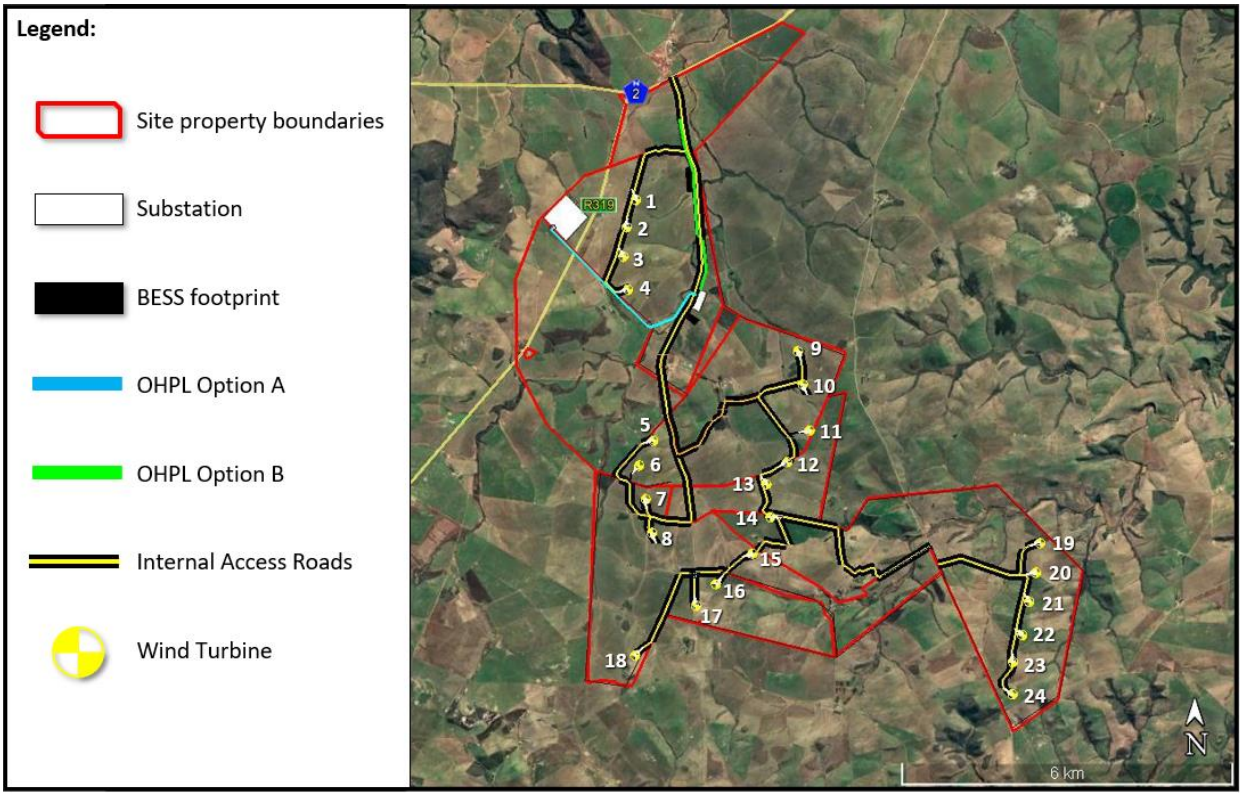


Figure 9.1: This shows the Preferred Alternative Layout, which has been assessed within this Basic Assessment Report.

During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed **As such, no alternative Layouts were investigated for the purpose of this BAR**.

9.1.4 Sustainable "Technology" Alternatives

These represent the latest and most efficient technology available at this current time and are the industry's highest producing onshore low wind turbine, designed for a broad range of wind and site conditions.

The OHPL designs presented are also the current industry standard, considered the most appropriate technology and are compliant with Eskom specifications and best international practice. The tower structures proposed for this project have been selected to result in the least impact on avifauna, wet areas, natural vegetation and visual landscapes.

Alternative technologies have not been considered as the technology to be used is already considered the most appropriate technology.

Based on the information presented within this Basic Assessment Report, it is reasonable to suggest that above-mentioned technology alternatives have been investigated and comprise the Preferred Alternative.

9.1.5 The "Operational "Alternative

During the project design phase, the Applicant underwent an iterative process, which was informed by environmental considerations and the appointed specialist recommendations and resulted in the Preferred Alternative which was analysed. **Therefore, no alternative sites were investigated for the purpose of this BAR**.

9.1.6 The "No Go" Option (Mandatory Option)

The No-Go Alternative usually implies the continuation of the status quo in terms of development potential, zoning and management. The No-Go Alternative would not achieve the general purpose and requirements of the activity, which is to increase the power generating capacity to the national grid

9.2 CONCLUDING STATEMENT INDICATING PREFERRED ALTERNATIVE (SITE, LAYOUT, LOCATION)

*In accordance with **Appendix 1 Regulation 3(g) and (h)(xi) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

> ***3(g)** – A motivation for the **preferred development footprint** within the approved site.*
>
> ***3(h) xi** – A concluding statement indicating the **preferred alternative development location** within the approved site*

The Preferred Alternative is the most feasible and reasonable alternative and has been comparatively assessed against the No-Go Alternative in this Report. Please kindly refer to Section 12 for the impact assessment.

Therefore, the **Preferred Alternative** for the purposes of this BAR refers to a Project alternative that takes into consideration and implements the findings and recommendations of the professional team, which have been noted above in terms of operational, layout and technology alternatives considered to date, and which have all been informed through independent expert assessments.

In conclusion and based on:

- the Specialist Study Findings undertaken by the Professional Team appointed to this this Project and represented in Section 8 of this Basic Assessment Report.
- the assessment undertaken by the EAP in conjunction with the Specialist Findings and represented in Section 08 and 11 of the Basic Assessment Report.
- the motivation of Alternatives in Section 9.

Based on the evidence presented by the independent specialists and the findings of this BAR, it is reasonable to suggest the overall impact associated with the Western Cape WEFF will be mitigated to an acceptable environmental level and therefore **the Preferred Alternative can be considered acceptable and implementable. There is no reason to suggest that the Competent Authority should not authorise the preferred alternative.**

10 SITE MATRIX BASED ON SENSITIVE AREAS ON SITE

In accordance with ***Appendix 1 Regulation 3(h) (ix); of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)****:*

3(h) ix *– the outcome of the site matrix*

In terms of Regulation 3 (h) and (ix) of GNR 326 of the NEMA EIA Regulations (2017, as amended) Appendix 1, a matrix is required to form part of this Basic Assessment Report.

This is in order to determine which areas of the site are:

- **Developable** in this BAR means areas that do not have any development constraints.
- **Acceptable** in this BAR means areas that have some development constraints and that the development in these areas can proceed, however, the specialist's recommended mitigation measures must be adhered to by the Applicant.
- **Not preferred** in this BAR means areas, which are unfavourable for the development and are fatally flawed and cannot be developed.

11 METHODOLOGY FOR ASSESSMENT OF POTENTIAL IMPACTS

In accordance with ***Appendix 1 Regulation 3(h) (vi) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended****):*

> ***3(h) vi*** *– The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives,*

The assessment of the potential impacts has been based on extensive experience related to environmental impact assessment as well as informed by specialist assessments and inputs, where applicable on the basis of professional judgement.

In this BAR, the types of potential impacts (direct, indirect, and cumulative) have been considered along with the nature and magnitude (severe, moderate, and low), extent and location of the potential impacts.

A prediction has been made of the timing (construction, operation or decommissioning phase) and duration (short, long term, intermittent or continuous) of the potential impact. A prediction has also been made of the likelihood or probability of impacts occurring and an estimation of the significance of the potential impact (local, regional or global scale).

Mitigation measures have been identified that are required to be implemented to lessen the potential impacts to acceptable levels and an evaluation of the predicted significance of residual impacts after mitigation is put into place, has been made. The assessment of the potential impacts will be carried out in a methodology that has been adapted from best practice guidelines disseminated from the Competent Authority.

These impacts have been identified based on the following:
- Inspection of the site and surroundings (current environmental conditions).
- Discussions with members of the project team.
- Discussions with relevant authorities.
- Previous investigations in the area.
- Independent specialist studies.
- Determining future changes to the environment as a result of the proposed activity.

Table 11.1: Definition of terminology

ITEM	DEFINITION
EXTENT	
Local	Extending only as far as the boundaries of the activity, limited to the site and its immediate surroundings
Regional	Impact on the broader region
National	Will have an impact on a national scale or across international borders
DURATION	
Short-term	0-5 years
Medium-Term	5-15 years
Long-Term	>15 years, where the impact will cease after the operational life of the activity
Permanent	Where mitigation, either by natural process or human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.
MAGNITUDE OR INTENSITY	
Low	Where the receiving natural, cultural or social function/environment is negligibly affected or where the impact is so low that remedial action is not required.
Medium	Where the affected environment is altered, but not severely and the impact can be mitigated successfully and natural, cultural or social functions and processes can continue, albeit in a modified way.
High	Where natural, cultural or social functions or processes are substantially altered to a very large degree. If a negative impact then this could lead to unacceptable consequences for the cultural and/or social functions and/or irreplaceable loss of biodiversity to the extent that natural, cultural or social functions could temporarily or permanently cease.
PROBABILITY	
Improbable	Where the possibility of the impact materialising is very low, either because of design or historic experience
Probable	Where there is a distinct possibility that the impact will occur
Highly Probable	Where it is most likely that the impact will occur
Definite	Where the impact will undoubtedly occur, regardless of any prevention measures
SIGNIFICANCE	
Low	Where a potential impact will have a negligible effect on natural, cultural or social environments and the effect on the decision is negligible. This will not require special design considerations for the project
Medium	Where it would have, or there would be a moderate risk to natural, cultural or social environments and should influence the decision. The project will require modification or mitigation measures to be included in the design
High	Where it would have, or there would be a high risk of, a large effect on natural, cultural or social environments. These impacts should have a major influence on decision making.
Very High	Where it would have, or there would be a high risk of, an irreversible negative impact on biodiversity and irreplaceable loss of natural capital that could result in the project being environmentally unacceptable, even with mitigation. Alternatively, it could lead to a major positive effect. Impacts of this nature must be a central factor in decision making.
STATUS OF IMPACT	
Whether the impact is positive (a benefit), negative (a cost) or neutral (status quo maintained)	
DEGREE OF CONFIDENCE IN PREDICTIONS	
The degree of confidence in the predictions is based on the availability of information and specialist knowledge (e.g. low, medium or high)	
MITIGATION	

Mechanisms used to control, minimise and or eliminate negative impacts on the environment and to enhance project benefits Mitigation measures should be considered in terms of the following hierarchy: (1) avoidance, (2) minimisation, (3) restoration and (4) off-sets.

To comparatively rank the impacts, each impact has been assigned a score using the scoring system outlined in Table 4 below. This scoring system allows for a comparative, accountable assessment of the indicative cumulative positive or negative impacts of each aspect assessed. A summary of the various impact scores is presented in Table 11.2 below to allow for easy reference and comparison of the various alternatives scoring.

Table 11.2: Scoring System for Impact Assessment Ratings

IMPACT PARAMETER	SCORE	
Extent (A)	**Rating**	
Local	1	
Regional	2	
National	3	
Duration (B)	**Rating**	
Short term	1	
Medium Term	2	
Long Term	3	
Permanent	4	
Probability (C)	**Rating**	
Improbable	1	
Probable	2	
Highly Probable	3	
Definite	4	
IMPACT PARAMETER	**NEGATIVE IMPACT SCORE**	**POSITIVE IMPACT SCORE**
Magnitude/Intensity (D)	**Rating**	**Rating**
Low	-1	1
Medium	-2	2
High	-3	3
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Rating**	**Rating**
Low	0 to - 40	0 to 40
Medium	- 41 to - 80	41 to 80
High	- 81 to - 120	81 to 120
Very High	> - 120	> 120

The above significance bands have been determined through calculating a maximum potential score of 156 (e.g. positive or negative) using the above methodology. This was then subdivided into broad bands as indicated above to provide a comparative assessment of all impacts in relation to the maximum possible significance score. The overall status of the impact (after mitigation) for the preferred

12 POTENTIAL IMPACTS ASSOCIATED WITH THE ACTIVITY

In accordance with ***Appendix 1 Regulation 3(h)(vii and viii) and Regulation 3 (i) and (j)of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)****):*

> ***3(h) vii*** *– Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects*
>
> ***3(h) viii*** *– The possible mitigation measures that could be applied and level of residual risk,*

Regulation 3(i) *- A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-*

> ***3(i) (i)*** *– A description of all environmental issues and risks that were identified during the environmental impact assessment process; and*
>
> ***3(i) (ii)*** *– An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures*

Regulation 3 (j) *– An assessment of each identified potentially significant impact and risk, including*

> ***3(j) (i)*** *– Cumulative impacts;*
>
> ***3(j) (ii)*** *– The nature, significance, and consequences of the impact and risk*
>
> ***3(j) (iii)*** *– The extent and duration of the impact and risk*
>
> ***3(j) (iv)*** *– The probability of the impact and risk occurring*
>
> ***3(j) (v)*** *– The degree to which the impact and risk can be reversed*
>
> ***3(j) (vi)*** *– The degree to which the impact and risk may cause irreplaceable loss of resources; and*
>
> ***3(j) (vii)*** *- -The degree to which the impact and risk can be mitigated*

The intention of this chapter is to raise awareness about **potential** impacts that are evident through the establishment and operation of the Project and associated infrastructure.

Potential environmental impacts and issues that may be associated with the construction,

> The **potential** impacts listed below have been assessed based on available information and through specialist recommendations, which have provided mitigation measures to ensure that the impacts associated with the activity are mitigation to acceptable levels.

operational and decommissioning phases of the proposed project and a summary of these have been identified and are listed below. Further please refer to the Figure below for a lifecycle depiction of the Project. The applicability and degree and extent of these impacts are anticipated to vary depending on the lifecycle stage of the development.

As part of this Environmental Permitting Process, an EMPr will be compiled for the various project life cycle stages to ensure that these impacts are minimised and/or eliminated where feasible.

Anticipated Project Life Cycle Phases:

12.1 POTENTIAL CONSTRUCTION / DECOMMISSIONING IMPACTS:

Based on the information assessed within this BAR the following construction and decommissioning impacts are likely to be prevalent during the construction and/or decommissioning phase of the Project.

The Preferred Alternative will be comparatively assessed against the No-Go Alternative as this is the most feasible and reasonable alternative, in terms of the impacts assessed by the professional team, taking into account all necessary mitigation measures, which ensure the least impact on the environment.

The potential construction and decommissioning impacts, have been assessed and all mitigation measures pertaining to the impacts identified, are detailed in the EMPr, which is attached for ease of reference as Appendix F.

In addition, the potential impacts have been assessed in terms of the required criteria, which requires the assessment of *"positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects".*

12.1.1 Agricultural Impacts

Based on the available information and the agricultural assessment, the following impacts have been assessed in this BAR:

Construction Phase Impacts

- Construction in proximity to natural drainage lines
- Removal of or damage to natural vegetation
- Degradation of natural resource: soil
- Disturbance to flow pattern of run-off water

Operational Phase Impacts

- Reduction of natural resource: soil
- Disturbance to flow pattern of run-off water
- Abstraction of groundwater
- Aerial crop spraying

12.1.1.1 *Agricultural Impact 1 (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Degradation of natural drainage**		**STATUS**	**NEGATIVE**
Impact Description	Construction in proximity to natural drainage lines.			
Impact Source(s)	Construction activities of the WEF and associated infrastructure.			
Receptor(s)	Natural drainage lines.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-2**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.2 *Agricultural Impact 2 (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Removal of or damage to natural vegetation**		**STATUS**	**NEGATIVE**
Impact Description	Deterioration and destruction of vegetation & veld			
Impact Source(s)	Construction activities of the WEF and associated infrastructure.			
Receptor(s)	Natural vegetation.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Improbable	1	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-1**	**Low**	**-1**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.3 *Agricultural Impact 3 (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

<table>
<tr><td>IMPACT NATURE</td><td colspan="2">Degradation of natural resource: soil</td><td>STATUS</td><td>NEGATIVE</td></tr>
<tr><td>Impact Description</td><td colspan="4">Soil loss as a result of water erosion.</td></tr>
<tr><td>Impact Source(s)</td><td colspan="4">Construction activities of the WEF and associated infrastructure.</td></tr>
<tr><td>Receptor(s)</td><td colspan="4">Natural resource: Soil</td></tr>
<tr><td>PARAMETER</td><td>WITHOUT MITIGATION</td><td>SCORE</td><td>WITH MITIGATION</td><td>SCORE</td></tr>
<tr><td>EXTENT (A)</td><td>Local</td><td>1</td><td>Local</td><td>1</td></tr>
<tr><td>DURATION (B)</td><td>Long term</td><td>3</td><td>Long term</td><td>3</td></tr>
<tr><td>PROBABILITY (C)</td><td>Probable</td><td>2</td><td>Improbable</td><td>1</td></tr>
<tr><td>INTENSITY OR MAGNITUDE (D)</td><td>Medium</td><td>-2</td><td>Medium</td><td>-2</td></tr>
<tr><td>SIGNIFICANCE RATING (F) = (A*B*D)*C</td><td>Low</td><td>-12</td><td>Low</td><td>-6</td></tr>
<tr><td>CUMULATIVE IMPACTS</td><td colspan="4">None expected.</td></tr>
<tr><td>CONFIDENCE</td><td colspan="4">High</td></tr>
<tr><td>MITIGATION MEASURES</td><td colspan="4">• Careful micro-siting can reduce the impact of all turbines.
• Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road.
• All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas.
• Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning.
• Subsoil can be used – if suitable – for road construction.
• The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested.
• The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.</td></tr>
</table>

12.1.1.4 *Agricultural Impact 4 (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Disturbance to flow pattern of run-off water**		**STATUS**	**NEGATIVE**
Impact Description	Disruption of contour banks			
Impact Source(s)	Construction activities of the WEF and associated infrastructure.			
Receptor(s)	Run-off flow pattern			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-16**	**Low**	**-8**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.5 *Agricultural Impact 5 (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	Reduction of natural resource: soil		STATUS	NEGATIVE
Impact Description	Soil loss as a result of WEF footprint.			
Impact Source(s)	Operational activities of the WEF and associated infrastructure.			
Receptor(s)	Natural resource: Soil			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-12**	**Low**	**-6**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.6 *Agricultural Impact 6 (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Disturbance to flow pattern of run-off water**		**STATUS**	**NEGATIVE**
Impact Description	Disruption of contour banks			
Impact Source(s)	Operational activities of the WEF and associated infrastructure.			
Receptor(s)	Run-off flow pattern			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-16**	**Low**	**-8**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.7 *Agricultural Impact 7 (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Abstraction of groundwater**		**STATUS**	**NEGATIVE**
Impact Description	Reduction in irrigation capacity of the property			
Impact Source(s)	Operational activities of the WEF and associated infrastructure.			
Receptor(s)	Natural resource: Groundwater			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-2**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.1.8 *Agricultural Impact 8 (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Aerial crop spraying**		**STATUS**	**NEGATIVE**
Impact Description	Interference with aircraft movement			
Impact Source(s)	Operational activities of the WEF and associated infrastructure.			
Receptor(s)	Pilots			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Improbable	1	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-3**	**Low**	**-3**
CUMULATIVE IMPACTS	None expected.			
CONFIDENCE	High			
MITIGATION MEASURES	• Careful micro-siting can reduce the impact of all turbines. • Consider re-alignment of the road section between turbines 22, 23 and 24 to co-inside with the existing farm road. • All construction activities (i.e. vehicle movement) in cultivated fields should be minimised and contained within clearly demarcated areas. • Topsoil (300 mm) should be stored at an appropriate site on each farm for future rehabilitation after decommissioning. • Subsoil can be used – if suitable – for road construction. • The establishment of a ground cover (vegetation) on disturbed land soon after construction is essential to reduce the risk of water erosion. Sowing of oats at the onset of the winter rainfall is suggested. • The implementation of a sloped turbine foundation rather than a flat surface is preferred, to assist soil water drainage after decommissioning.			

12.1.2 Avifaunal Impacts

Based on the available information and the avifaunal assessment, the following impacts have been assessed in this BAR:

Construction Phase Impacts

- Displacement of priority avifauna

Operational Phase Impacts

- Mortality of priority avifauna
- Mortality of Cape Vultures

No-Go Option

- The no-go alternative will result in the current status quo being maintained as far as the avifauna is concerned. The no-go option would therefore eliminate any additional impact on the ecological integrity of the proposed development site as far as avifauna is concerned. It should be noted though that the project is heavily transformed which has already had a huge impact on the original species composition, for example the lack of Black Harriers at site is the direct consequence of the lack of indigenous Renosterveld.

12.1.2.1 *Avifaunal Impact 1 – Displacement of priority avifauna (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Displacement of priority avifauna**		**STATUS**	**NEGATIVE**
Impact Description	The noise and movement associated with the construction activities at the WEF footprint will be a source of disturbance which would lead to the displacement of avifauna from the area.			
Impact Source(s)	Construction activities of the WEF and associated infrastructure.			
Receptor(s)	Priority avifauna.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Highly probable	3	Highly probable	3
INTENSITY OR MAGNITUDE (D)	High	-3	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-9**	**Low**	**-6**
CUMULATIVE IMPACTS	The noise and movement associated with the construction activities of all the proposed and operational WEFs in the region will be a source of disturbance which would lead to the displacement of avifauna from the project sites.			
CONFIDENCE	High			
MITIGATION MEASURES	• Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. Access to the remainder of the area should be strictly controlled to prevent unnecessary disturbance of priority species. • Construction of new roads should only be considered if existing roads cannot be upgraded. • Measures to control noise and dust should be applied according to current best practice in the industry.			

IMPACT NATURE	**Displacement of priority avifauna**		**STATUS**	**NEGATIVE**
Impact Description	Total or partial displacement of avifauna due to habitat transformation associated with the presence of the wind turbines and associated infrastructure.			
Impact Source(s)	Habitat transformation associated with the construction of the WEF and associated infrastructure			
Receptor(s)	Priority avifauna			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Highly probable	3	Highly probable	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-18**	**Low**	**-12**
CUMULATIVE IMPACTS	The habitat transformation associated with the construction of all the proposed and operational WEFs in the region will affect the habitat negatively which would lead to the displacement of avifauna from the project sites.			
CONFIDENCE	Medium			
MITIGATION MEASURES	• Vehicle and pedestrian access to the site should be controlled and restricted to the construction footprint as much as possible to prevent unnecessary destruction of vegetation. • Formal live-bird monitoring should be resumed once the turbines have been constructed, as per the most recent edition of the Best Practice Guidelines (Jenkins *et al.* 2015). The purpose of this would be to establish if displacement of priority species has occurred and to what extent. The exact time when operational monitoring should commence, will depend on the construction schedule, and should commence when the first turbines start operating. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated in year 5, and again every five years thereafter for the operational lifetime of the facility.			

12.1.2.2 *Avifaunal Impact 2 – Mortality of priority avifauna (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	Mortality of priority avifauna		STATUS	NEGATIVE
Impact Description	Priority avifauna will get killed or injured through collisions with the wind turbines.			
Impact Source(s)	Wind turbines			
Receptor(s)	Priority avifauna			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Regional	2	Local	2
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Highly probable	3	Improbable	1
INTENSITY OR MAGNITUDE (D)	High	-3	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Medium**	**-54**	**Low**	**-12**
CUMULATIVE IMPACTS	The operation of all the proposed and operational WEFs in the region will be a source of mortality which would lead to significant impacts on priority avifauna, including Red Data species.			
CONFIDENCE	High			
MITIGATION MEASURES	• A system of Shutdown on Demand (SDoD) should be implemented for all turbines at the WEF, modelled on the system which is currently operational at the nearby Excelsior Wind Farm. • All carcasses of livestock and placentas from lambing ewes should be removed timeously from the wind farm site to prevent Cape Vultures from being attracted to the wind farm site. • No turbines should be located in the 750m buffer zones as indicated in the sensitivity map in Appendix E. These buffer zones are all linked to alien tree stands, which could attract many priority species. • Formal live-bird monitoring and carcass searches should be implemented in the operational phase, as per the most recent edition of the Best Practice Guidelines at the time (Jenkins et al. 2015) to assess collision rates. The Best Practice Guidelines require that, as an absolute minimum, operational monitoring should be undertaken for the first two (preferably three) years of operation, and then repeated in year 5, and again every five years thereafter for the operational lifetime of the facility •			

IMPACT NATURE	Mortality of priority avifauna		STATUS	NEGATIVE
Impact Description	Priority avifauna will get killed through electrocution in the onsite substation			
Impact Source(s)	Onsite substation			
Receptor(s)	Priority avifauna			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Regional	2	Local	2
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-24**	**Low**	**-12**
CUMULATIVE IMPACTS	The onsite substations of all the proposed and operational WEFs in the region could be a source of mortality which would lead to impacts on priority avifauna, including Red Data species.			
CONFIDENCE	Medium			
MITIGATION MEASURES	• The hardware in the substation is too complicated and the risk too low to warrant pro-active mitigation. The substation should be inspected weekly by the operator, and if any electrocution mortality is recorded, it should be reported to the avifaunal specialist. If the mortality levels exceed thresholds determined by the avifaunal specialist in consultation with BirdLIfe South Africa, reactive mitigation in the form of insulation or perch deterrents should be implemented.			

IMPACT NATURE	Mortality of Cape Vultures		STATUS	NEGATIVE
Impact Description	Cape Vultures could get killed through electrocution on the 132kV grid connection.			
Impact Source(s)	The 132kV grid connection			
Receptor(s)	Cape Vultures			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Regional	2	Local	2
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	High	-3	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-36**	**Low**	**-12**
CUMULATIVE IMPACTS	The grid connections of all the proposed and operational WEFs in the region could be a source of mortality which would lead to impacts on Cape Vultures.			
CONFIDENCE	Medium			
MITIGATION MEASURES	The vulture friendly DT 7649 steel monopole should be used for the 132kV grid.			

12.1.3 Bat Impacts

Based on the available information and the Bat Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction Phase Impacts

- Roost disturbance
- Roost destruction
- Habitat modification

Operational Phase Impacts

- Light pollution
- Habitat Creation in High-Risk Locations
- Mortality during commuting and/or foraging
- Mortality during Migration

12.1.3.1 *Bat Impact 1 – Roost Disturbance (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

<table>
<tr><td>IMPACT NATURE</td><td colspan="3">Bat Impact – Roost Disturbance
Construction Phase</td><td>STATUS</td><td>NEGATIVE</td></tr>
<tr><td>Impact Description</td><td colspan="5">Wind Farms have the potential to impact bats directly through the disturbance of roosts during construction.</td></tr>
<tr><td>Impact Source(s)</td><td colspan="5">Construction activities for wind turbines and associated infrastructures.
Disturbance near roosting locations.</td></tr>
<tr><td>Receptor(s)</td><td colspan="5">Bats and roosting structures (buildings, trees, rock crevices etc.).</td></tr>
<tr><td>PARAMETER</td><td>WITHOUT MITIGATION</td><td>SCORE</td><td colspan="2">WITH MITIGATION</td><td>SCORE</td></tr>
<tr><td>EXTENT (A)</td><td>Local</td><td>1</td><td colspan="2">Local</td><td>1</td></tr>
<tr><td>DURATION (B)</td><td>Short-term</td><td>1</td><td colspan="2">Short-term</td><td>1</td></tr>
<tr><td>PROBABILITY (C)</td><td>Probable</td><td>2</td><td colspan="2">Improbable</td><td>1</td></tr>
<tr><td>INTENSITY OR MAGNITUDE (D)</td><td>Medium</td><td>-2</td><td colspan="2">Low</td><td>-1</td></tr>
<tr><td>SIGNIFICANCE RATING (F) = (A*B*D)*C</td><td>Low</td><td>-4</td><td colspan="2">Low</td><td>-1</td></tr>
<tr><td>CUMULATIVE IMPACTS</td><td colspan="5">See Section 12.1.2.8</td></tr>
<tr><td>CONFIDENCE</td><td colspan="5">Medium</td></tr>
<tr><td>MITIGATION MEASURES</td><td colspan="5">It may be possible to limit roost abandonment by avoiding construction activities near roosts. No roosts were found on site but there may be more potential roosts that bats may be using including trees and buildings.
It is recommended that potential roosts, specifically trees and buildings, are buffered by 200 m inside which no turbine infrastructure may be placed. These buffers have been mapped (Figure 2) and are to blade tip. No construction activities must occur within 1 km of any confirmed roost.
It is recommended that a bat specialist survey the confirmed turbine locations and all other proposed site infrastructure for the presence of roosts within 200 m before any construction activities commence and once the preliminary design and layout of each Wind Farm is complete.</td></tr>
</table>

Note that the score for all No-Go alternative parameters are based off the Specialist's assessment of unchanged impacts, as they are not explicitly listed by the specialist.

12.1.3.2 *Bat Impact 2 – Roost Destruction (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Bat Impact – Roost Destruction Construction Phase**		**STATUS**	**NEGATIVE**
Impact Description	Wind Farms have the potential to impact bats directly through the physical destruction of roosts during construction.			
Impact Source(s)	Construction activities for wind turbines and associated infrastructures. Destruction of roosts and potential roosts.			
Receptor(s)	Bats and roosting structures (buildings, trees, rock crevices etc.).			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short-term	1	Short-term	1
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-1**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Medium			
MITIGATION MEASURES	• It may be possible to limit roost abandonment by avoiding construction activities near roosts. No roosts were found on site but there may be more potential roosts that bats may be using including trees and buildings. • It is recommended that potential roosts, specifically trees and buildings, are buffered by 200 m inside which no turbine infrastructure may be placed. These buffers have been mapped (Figure 2) and are to blade tip. No construction activities must occur within 1 km of any confirmed roost. • It is recommended that a bat specialist survey the confirmed turbine locations and all other proposed site infrastructure for the presence of roosts within 200 m before any construction activities commence and once the preliminary design and layout of each Wind Farm is complete.			

12.1.3.3 *Bat Impact 3 – Habitat Modification (Construction Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Bat Impact – Habitat Modification Construction Phase**		**STATUS**	**NEGATIVE**
Impact Description	Bats can be impacted indirectly through the modification or removal of habitats and can also be displaced from foraging habitat by the construction of wind turbines.			
Impact Source(s)	Construction activities for wind turbines and associated infrastructures. Modification of habitat.			
Receptor(s)	Bats and relevant habitats (vegetation cover, linear features etc.).			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-6**	**Low**	**-1**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Medium			
MITIGATION MEASURES	• During construction, laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation. Construction should, where possible, be situated in areas that are already disturbed. • This impact must be reduced by limiting the removal of vegetation, particularly trees, as far as possible. Habitat modification should also not occur in the no-go areas of the sensitivity map. • Before construction commences, a bat specialist should conduct a site walkthrough, covering the final road and power line routes as well as the final turbine positions, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats. • Following construction, rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a botanical specialist and included within the EMPr.			

12.1.3.4 *Bat Impact 4 – Light Pollution (Construction and Operational Phases)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Bat Impact – Light Pollution Construction and Operational Phases**		**STATUS**	**NEGATIVE**
Impact Description	Certain bat species actively forage around artificial lights due to the higher numbers of insects which are attracted to these lights. This may bring these species into the vicinity of the operating turbines and increase the risk of collision/barotrauma for these species.			
Impact Source(s)	Construction and Operational activities for wind turbines and associated infrastructures. Light Pollution from security lighting.			
Receptor(s)	Bats			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-12**	**Low**	**-3**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Medium			
MITIGATION MEASURES	• This impact can be mitigated by using as little lighting as possible, and only where essential for operation of the facility. • Where lights need to be used such as at the substation and switching station and elsewhere, these should have low attractiveness for insects such as low-pressure sodium and warm white LED lights (Rydell 1992; Stone 2012). High pressure sodium and white mercury lighting is attractive to insects (Blake et al. 1994; Rydell 1992; Svensson & Rydell 1998) and should not be used as far as possible. • Lighting should be fitted with movement sensors to limit illumination and light spill, and the overall lit time. In addition, the spread of light should be directed downward (below the horizontal plane) to minimise light trespass and sky glow. • Increasing the spacing between lights, and the height of light units can reduce the intensity and volume of the light to minimise the area illuminated and give bats an opportunity to fly in relatively dark areas between and over lights.			

12.1.3.5 *Bat Impact 5 – Habitat Creation in High-Risk Locations (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Habitat Creation in High-Risk Locations**		**STATUS**	**NEGATIVE**
Impact Description	The construction of a Wind Farm and associated building infrastructure may inadvertently provide new roosts for bats, when the facility becomes operational, attracting them to the area and indirectly increasing the risk of negative mortality impacts.			
Impact Source(s)	New buildings that inadvertently provide new roosts for bats.			
Receptor(s)	Bats potentially roosting in new buildings.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-12**	**Low**	**-3**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Medium			
MITIGATION MEASURES	• Bats should be prevented from entering any possible artificial roost structures (e.g. roofs of buildings, road culverts and wind turbines) by ensuring that they are sealed in such a way as to prevent bats from entering. • If bats colonise Wind Farm infrastructure, a suitably qualified bat specialist should be consulted before any work is undertaken on that infrastructure or attempting to remove bats. Ongoing maintenance and inspections of buildings and road culverts must be carried out to ensure access by bats is prevented and for the safe handling of actively roosting bats.			

12.1.3.6 *Bat Impact 6 – Mortality during commuting and/or foraging (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Bat Impact – Mortality during commuting and/or foraging**		**STATUS**	**NEGATIVE**
Impact Description	The major potential impact of wind turbines on bats is direct mortality resulting from collisions with turbine blades and/or barotrauma. These impacts will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines.			
Impact Source(s)	Operation of wind turbines.			
Receptor(s)	Bats.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Regional	2	Regional	2
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Definite	4	Probable	2
INTENSITY OR MAGNITUDE (D)	High	-3	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Medium**	**-72**	**Low**	**-24**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Medium			
MITIGATION MEASURES	• Designing the turbine layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. These areas include key microhabitats such as water features, trees and buildings. The turbine layout must adhere to the bat sensitivity buffer zones around these features. Turbines must be sited outside of buffer areas such that blade tips do not encroach into buffer zones. • The height of the lower blade swept height must be maximised, and should not be lower than 50 m if possible as turbines with a lower ground clearance run the risk of reaching the fatality thresholds sooner. • Apply blade feathering to prevent unnecessary free-wheeling of blades below generation cut-in speed at operation commencement. • Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Operational monitoring must be done for the first two years initially according to the guidelines. Depending on these findings, additional			

	monitoring may be needed but must be determined by an appropriate bat specialist using the operational data. Thereafter, a year of impact monitoring is required in the fifth year of operation and every five years after that. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level. • Apply curtailment based on a curtailment plan formulated by an appropriate bat specialist using weather and bat activity data from the site if mortality occurs beyond threshold levels (i.e. 141 bats) as determined based on applicable guidance (MacEwan et al. 2018). The threshold calculations must be done at a minimum of once a quarter (i.e. not only after the first year of operational monitoring) so that mitigation can be applied as quickly as possible should thresholds be reached.

12.1.3.7 *Bat Impact 7 – Mortality during Migration (Operational Phase)*

Based on the available information it is reasonable to suggest that this impact has a **medium negative** impact.

IMPACT NATURE	**Bat Impact – Mortality during Migration**		**STATUS**	**NEGATIVE**
Impact Description	It has been suggested that some bats may not echolocate when they migrate (Baerwald and Barclay 2009) which could explain the higher numbers of migratory species suffering mortality in Wind Farm studies in North America and Europe. Therefore, the direct impact of bat mortality may be higher when they migrate compared to when they are commuting or foraging.			
Impact Source(s)	Operation of wind turbines.			
Receptor(s)	Bats.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	National	3	National	3
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Highly Probable	3	Highly Probable	2
INTENSITY OR MAGNITUDE (D)	High	-3	Medium	-3
SIGNIFICANCE RATING (F) = (A*B*D)*C	**High**	**-81**	**Medium**	**-54**
CUMULATIVE IMPACTS	**See Section 12.1.2.8**			
CONFIDENCE	Low			
MITIGATION MEASURES	• Designing the turbine layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. These areas include key microhabitats such as water features, trees and buildings. The turbine layout must adhere to the bat sensitivity buffer zones around these features (Figure 2). Turbines must be sited outside of buffer areas such that blade tips do not encroach into buffer zones. • The height of the lower blade swept height must be maximised, and should not be lower than 50 m if possible as turbines with a lower ground clearance run the risk of reaching the fatality thresholds sooner. • Apply blade feathering to prevent unnecessary free-wheeling of blades below generation cut-in speed at operation commencement. • Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Operational monitoring must be done for the first two years initially according to the guidelines. Depending on these findings, additional monitoring may be needed but must be determined by an appropriate bat specialist using the operational data. Thereafter, a year of impact			

	monitoring is required in the fifth year of operation and every five years after that. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level. • Apply curtailment based on a curtailment plan formulated by an appropriate bat specialist using weather and bat activity data from the site if mortality occurs beyond threshold levels (i.e. 141 bats) as determined based on applicable guidance (MacEwan et al. 2018). The threshold calculations must be done at a minimum of once a quarter (i.e. not only after the first year of operational monitoring) so that mitigation can be applied as quickly as possible should thresholds be reached.

12.1.3.8 *Bat Impact –Cumulative Bat Mortality*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Bat Impact –Cumulative Bat Mortality**		**STATUS**	**NEGATIVE**
Impact Description	Cumulative indirect impacts to bats, such as those relating to changes to physical environment (e.g. roost and habitat destruction) are likely to be moderate across the cumulative impact regions if site-specific mitigation measures are adhered to by all renewable energy developments. Cumulative direct impacts to bats, specifically related to bat mortality, are likely to be severe. For non-migratory species cumulative direct impacts could have a high significance before mitigation but could reduce to medium with appropriate turbine siting and operational mitigation as determined by preconstruction and operational monitoring studies. Direct impacts on migratory species (i.e. the Natal long-fingered bat) may be high before mitigation but could also reduce to medium with appropriate turbine siting and operational mitigation. However, these ratings would be dependent on all other surrounding wind energy facilities also adopting similar mitigation strategies to reduce impacts to bats. There is currently one operational wind energy facility in the cumulative impact area and at least four more that have been approved. At this time, impacts to bats are low to medium but would increase when more Wind Farms are constructed.			
Impact Source(s)	Changes to physical environment and bat mortality over projects on a cumulative scale.			
Receptor(s)	Bats and relevant habitats (vegetation cover, linear features, roosting structures etc.).			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	National	3	National	3
DURATION (B)	Long-term	3	Long-term	3
PROBABILITY (C)	Highly Probable	3	Probable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Medium**	**-54**	**Low**	**-18**
CUMULATIVE IMPACTS	N/A			
CONFIDENCE	Medium			

MITIGATION MEASURES	• At operational wind energy facilities where bat fatality rates exceed threshold values (141 bats), mitigation strategies such as curtailment or deterrents must be implemented. These mitigation strategies and curtailment regimes must be based on pre-construction monitoring from the specific site and be drawn up by a qualified specialist. • The operation of lights at substations should be limited to avoid attracting bats to the area. Where lights need to be used such as at the substation and switching station and elsewhere, these should have low attractiveness for insects such as low pressure sodium and warm white LED lights (Rydell 1992; Stone 2012). High pressure sodium and white mercury lighting is attractive to insects (Blake et al. 1994; Rydell 1992; Svensson & Rydell 1998) and should not be used as far as possible. • Lighting should be fitted with movement sensors to limit illumination and light spill, and the overall lit time. In addition, the upward spread of light near to and above the horizontal plane should be restricted and directed to minimise light trespass and sky glow. • Increasing the spacing between lights, and the height of light units can reduce the intensity and volume of the light to minimise the area illuminated and give bats an opportunity to fly in relatively dark areas between and over lights. • Each development must avoid construction and turbine siting in bat no-go areas of the sensitivity maps determined for each site to ensure effective mitigation of cumulative impacts.

12.1.4 Botanical Impacts

Based on the available information and the Botanical Assessment, the following impacts have been assessed in this BAR:

Construction and Operational Phase Impacts

- Loss of natural and partly natural vegetation (construction phase)
- Establishment and spread of declared weeds and alien invader plants (construction and operational phase)

12.1.4.1 Botanical Impact 1 – Loss of natural and partly natural vegetation (Construction Phase)

Based on the available information it is reasonable to suggest that this impact has a **low-medium negative** impact.

IMPACT NATURE	Loss of natural and partly natural vegetation.		STATUS	NEGATIVE
Impact Description	Loss of <1ha of High sensitivity Cape Lowland Alluvial vegetation on site; all vegetation is of a Critically Endangered type; no loss of plant Species of Conservation Concern; loss of <1ha of mapped ESA2.			
Impact Source(s)	Development of the WEF			
Receptor(s)	Loss of natural and partly natural vegetation			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent & long term	3	Permanent & long term	3
PROBABILITY (C)	Definite	2	Definite	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Medium	-2
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low - Medium**	**-12**	**Low - Medium**	**-12**
CUMULATIVE IMPACTS	**The overall cumulative botanical impact of the loss of natural vegetation in the study area would be Very Low negative**			
CONFIDENCE	High			
MITIGATION MEASURES	• No special mitigation is required, as the proposed project layout has taken the botanical constraints into account and avoids the main sensitive areas as far as possible.			

12.1.4.2 *Botanical Impact 2 –Operation Phase*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Grazing and trampling by cattle and livestock; no further cultivation or development of new footprints; no alien invasive vegetation management**		**STATUS**	**NEGATIVE**
Impact Description	Ongoing alien invasive vegetation in natural and areas adjacent to fields; grazing and trampling of sensitive plants and habitats; suboptimal fire regimes for Renosterveld; minor random agricultural impacts.			
Impact Source(s)	Operation of the WEF			
Receptor(s)	Grazing and trampling by cattle and livestock; no further cultivation or development of new footprints; no alien invasive vegetation management.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Probable	2	Probable	2
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-6**	**Low**	**-6**
CUMULATIVE IMPACTS	**The overall cumulative botanical impact of the loss of natural vegetation in the study area would be Very Low negative**			
CONFIDENCE	High			
MITIGATION MEASURES	• No special mitigation is required, as the proposed project layout has taken the botanical constraints into account and avoids the main sensitive areas as far as possible.			

12.1.5 Freshwater Impacts

Based on the available information and the Freshwater Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction, Operational and Decommissioning Phase Impacts

- Construction and operation of WEF
- Construction and operation of roads within the WEF.
- Cumulative Impacts

12.1.5.1 *Aquatic Impact 1 –Construction and Operation Phases*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Aquatic Impact**		**STATUS**	**NEGATIVE**
Impact Description	Disturbance of aquatic habitat; modification to flow and water quality due to the proposed activities in or adjacent to aquatic ecosystems.			
Impact Source(s)	Construction and operation of WEF.			
Receptor(s)	Minor and larger watercourses within the associated properties.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Improbable	1	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-1**	**Low**	**-1**
CUMULATIVE IMPACTS	**Low cumulative impact. The proposed WEF would however not be expected to significantly alter the current ecological status of the watercourses and wetland areas in the area provided that the recommended buffers are adhered to.**			
CONFIDENCE	High			
MITIGATION MEASURES	• A buffer of at least 50 m between the delineated aquatic ecosystems and all the proposed project activities should be maintained adjacent to the river in which valley bottom wetlands occur (as measured from the outer edge of the wetland or river corridor).			

12.1.5.2 *Aquatic Impact 2 –Decommissioning Phase*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Aquatic Impact**		**STATUS**	**NEGATIVE**
Impact Description	Disturbance of aquatic habitat; modification to flow and water quality due to the proposed activities in or adjacent to aquatic ecosystems.			
Impact Source(s)	Construction and operation of roads within the WEF.			
Receptor(s)	Minor and larger watercourses within the associated properties.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	2	Short term	1
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-1**
CUMULATIVE IMPACTS	**Low cumulative impact. The proposed WEF would however not be expected to significantly alter the current ecological status of the watercourses and wetland areas in the area provided that the recommended buffers are adhered to.**			
CONFIDENCE	High			
MITIGATION MEASURES	• A buffer of at least 50 m between the delineated aquatic ecosystems and all the proposed project activities should be maintained adjacent to the river in which valley bottom wetlands occur (as measured from the outer edge of the wetland or river corridor).			

12.1.5.3 *Aquatic Impact 3 –Cumulative Impacts*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Aquatic Impact**		**STATUS**	**NEGATIVE**
Impact Description	Disturbance of aquatic habitat; modification to flow and water quality due to the proposed activities in or adjacent to aquatic ecosystems.			
Impact Source(s)	Construction and operation of roads within the WEF.			
Receptor(s)	Minor and larger watercourses within the associated properties.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	2	Short term	1
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-1**
CUMULATIVE IMPACTS	**Low cumulative impact. The proposed WEF would however not be expected to significantly alter the current ecological status of the watercourses and wetland areas in the area provided that the recommended buffers are adhered to.**			
CONFIDENCE	High			
MITIGATION MEASURES	• Placement of turbines and associated WEF infrastructure to minimise disturbance of aquatic features within the site and allow for adequate buffers to ensure the protection of the aquatic features. The potential stormwater impacts of the areas of the proposed development should be mitigated on-site to address any erosion or water quality impacts. Good housekeeping measures as stipulated in the EMPr for the project should be in place where construction activities take place to prevent contamination of any freshwater features. Where possible, infrastructure should coincide with existing infrastructure or areas of disturbance (such as existing roads). • Disturbed areas should be rehabilitated through the reshaping of the surface to resemble that before the disturbance and vegetated with suitable local indigenous vegetation. Any new road crossings through the watercourses should cross perpendicular to the channels and should not impede or concentrate flow in the channels. Undertake ongoing and long-term monitoring and management of aquatic features to prevent the impacts of erosion and invasive alien vegetation growth.			

12.1.6 Heritage Impacts

Based on the available information and the Heritage Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction Phase Impacts

- Destruction of the cultural landscape
- Destruction of archaeological heritage
- Destruction of palaeontological heritage

12.1.6.1 *Cultural Landscape Impact 1 –Construction Phase*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Destruction of the cultural landscape**		**STATUS**	**NEGATIVE**
Impact Description	Destruction of significant cultural landscape resources			
Impact Source(s)	Construction of the WEF			
Receptor(s)	Cultural landscape resources			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Regional	2	Regional	2
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Definite	4	Probable	2
INTENSITY OR MAGNITUDE (D)	High	-3	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-60**	**Low**	**-12**
CUMULATIVE IMPACTS	**Cumulative impacts anticipated but unavoidable.**			
CONFIDENCE	High			
MITIGATION MEASURES	• A no-go development buffer of 500m for wind turbine infrastructure must be implemented around the farm werfs within the development area. • The Design Criteria should be adhered to.			

12.1.6.2 *Archaeology Impact 2 –Construction Phase*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Destruction of archaeological heritage**		**STATUS**	**NEGATIVE**
Impact Description	Destruction of significant archaeological heritage resources during the construction phase			
Impact Source(s)	Construction of the WEF			
Receptor(s)	Archaeological heritage resources			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Highly Probable	3	Improbable	1
INTENSITY OR MAGNITUDE (D)	High	-3	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-36**	**Low**	**-4**
CUMULATIVE IMPACTS	**None anticipated**			
CONFIDENCE	High			
MITIGATION MEASURES	• A pre-construction walkdown of the final authorised layout including the powerline route must be conducted by an archaeologist to identify any areas requiring targeted mitigation in the form of excavation or removal of heritage resources. A walkdown report detailing the findings of the walkdown and the final layout must be submitted to HWC. • Should any previously undocumented heritage resources be identified during the course of the construction, operation or decommissioning of the project, work must cease in the area of the find and HWC must be contacted regarding a way forward.			

12.1.6.3 *Palaeontology Impact 3 –Construction Phase*

Based on the available information it is reasonable to suggest that this impact has a **low-negative** impact.

IMPACT NATURE	**Destruction of palaeontological heritage**		**STATUS**	**NEGATIVE**
Impact Description	Destruction of significant palaeontological heritage resources during the construction phase			
Impact Source(s)	Construction of the WEF			
Receptor(s)	Palaeontological heritage resources			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-16**	**Low**	**-4**
CUMULATIVE IMPACTS	**None anticipated**			
CONFIDENCE	High			
MITIGATION MEASURES	The HWC Chance Fossil Finds Procedure must be implemented for the duration of construction activities			

12.1.7 Noise Impacts

Based on the available information and the Noise Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction Phase Impacts

- Construction Activities

Operational Phase

- Operational Noise

Decommissioning Phase Impacts

- Decommissioning Activities

12.1.7.1 *Noise Impact 1 – Construction Activities*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Noise from grading and building of new roads**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the construction activities.			
Impact Source(s)	Construction vehicles such as graders, rippers, earthmoving equipment, hauling vehicles.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Construction of trenches and new roads to take place during daytime only			

IMPACT NATURE	Noise from the preparation of the footprint, earthworks, and construction of the base of the wind turbine		STATUS	NEGATIVE
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the construction activities.			
Impact Source(s)	Construction vehicles such as graders, rippers, earthmoving equipment, hauling vehicles.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Construction activities to take place during daytime only			

IMPACT NATURE	Noise from the construction of the wind turbines – off loading of blades, generator, and mast.		STATUS	NEGATIVE
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the construction activities.			
Impact Source(s)	Cranes, generators, heavy-duty motor vehicles.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Construction activities to take place during daytime only			

IMPACT NATURE	Noise from construction vehicles and traffic to and from the wind turbine construction sites.	STATUS	NEGATIVE	
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the construction activities.			
Impact Source(s)	Low-bed vehicles, generator, construction vehicles.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Construction activities to take place during daytime only			

12.1.7.2 *Noise Impact 2 – Operational Noise*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Noise generated by the wind turbines.**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the wind turbine site/s			
Impact Source(s)	Blades, nacelle.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-8**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	• Ensure that all wind turbines have a buffer of 500m between the wind turbine and the noise sensitive areas. Latest technology to be applied to blade design to minimise the noise levels and to take care of the low frequency noise, turbulent inflow noise, turbulent boundary layer trailing edge noise, boundary layer vortex shedding noise, tip vortex formation noise and the trailing edge bluntness vortex noise.			

IMPACT NATURE	**Noise from mechanical noise generated by the gearbox and generator (nacelle) which is situated at 119m from ground level.**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the turbines during the operational phase.			
Impact Source(s)	Generator and nacelle.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-8**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Acoustic insulation on the inside of the Nacelle turbine housing; Acoustic insulation curtains; Anti-vibration support footing.			

IMPACT NATURE	Noise from normal wear and tear of the essential components such as gear-box, generator and blades.		STATUS	NEGATIVE
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the wind turbines.			
Impact Source(s)	Generator and nacelle.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-8**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	• Cyclic maintenance programme of the wind turbines; Withdraw from services should a wind turbine create excessive noise due to wear and tear or poor maintenance.			

IMPACT NATURE	Noise from amplitude modulation.		STATUS	NEGATIVE
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the wind turbines.			
Impact Source(s)	Blades.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-8**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	• Ensure that all wind turbines have a buffer of 500m between the wind turbine and the noise sensitive areas. Latest technology to be applied to blade design to minimise the noise levels and to take care of the low frequency noise, turbulent inflow noise, turbulent boundary layer trailing edge noise, boundary layer vortex shedding noise, tip vortex formation noise and the trailing edge bluntness vortex noise.			

IMPACT NATURE	Noise from traffic to and from the wind turbine sites.		STATUS	NEGATIVE
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the traffic along the access roads to the turbines.			
Impact Source(s)	Motor-vehicles			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-8**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Internal roads to be always kept in a good condition and free from potholes.			

IMPACT NATURE	**Noise from sub-station and overhead power lines.**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the sub-station and the overhead power lines.			
Impact Source(s)	Sub-station and overhead power lines.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Overhead power lines to be erected some distance from the residential properties.			

IMPACT NATURE	**Noise from cyclic and/or emergency maintenance activities.**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the maintenance activities.			
Impact Source(s)	Power tools and emergency generator (if required)			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Permanent	4	Permanent	4
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Maintenance and/or emergency repairs to be done in such a manner that the prevailing ambient noise will not be exceeded by more than 7.0dBA.			

12.1.7.3 *Noise Impact 3 – Decommissioning Phase Noise*

Based on the available information it is reasonable to suggest that this impact has a **low negative** impact.

IMPACT NATURE	**Noise from removal of wind turbines and the rehabilitation of the wind turbine sites.**		**STATUS**	**NEGATIVE**
Impact Description	Change in the prevailing ambient noise levels in the vicinity of the rehabilitation sites.			
Impact Source(s)	Earthmoving machinery, rehabilitation machinery/tools.			
Receptor(s)	Farm-houses B, C, D, E, F, J, I and, P			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Medium term	2	Medium term	2
PROBABILITY (C)	Probable	2	Improbable	1
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-4**
CUMULATIVE IMPACTS	**The noise impact during the daytime will be below the threshold value of 7.0dBA.**			
CONFIDENCE	High			
MITIGATION MEASURES	Construction activities to take place during daytime only			

12.1.8 Social Impacts

Based on the available information and the Social Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction Phase Impacts

- Nuisance factors - dust and noise
- Influx of job seekers
- Increase in local crime
- Temporary employment
- Contribution towards local economic income

Operational Phase

- Human health and well-being
- Education and training opportunities
- Provision of renewable energy
- Surrounding property values
- Direct spending
- Creating new employment
- Revenue for local Municipality

Decommissioning Phase Impacts

- Decommissioning Activities

12.1.8.1 *Social Impact 1 – Nuisance factors - dust and noise*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Nuisance factors - dust and noise (Construction Phase)**		**STATUS**	**NEGATIVE**
Impact Description	Construction activities will create dust and noise			
Impact Source(s)	On-site construction activities and vehicles			
Receptor(s)	Surrounding land users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Definite	4	Definite	4
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-8**	**Low**	**-4**
CUMULATIVE IMPACTS	**Additional construction activities in the immediate area will compound the nuisance factors.**			
CONFIDENCE	High			
MITIGATION MEASURES	Dust and noise emissions could be minimised through a CEMP.			

12.1.8.2 *Social Impact 2 – Influx of job seekers*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Influx of job seekers (Construction Phase)**		**STATUS**	**NEGATIVE**
Impact Description	Influx of job seekers will lead to competition with local residents for employment opportunities			
Impact Source(s)	Expectation of new employment opportunities at the development site			
Receptor(s)	Development site and contractors			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Probable	2	Probable	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-2**
CUMULATIVE IMPACTS	**Additional construction projects in the area would attract more job seekers**			
CONFIDENCE	Medium			
MITIGATION MEASURES	Contractor to employ local residents as far as possible			

12.1.8.3 *Social Impact 3 – Increase in local crime*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Increase in local crime (Construction Phase)**		**STATUS**	**NEGATIVE**
Impact Description	Construction activities may contribute to an increase in local crime			
Impact Source(s)	On-site petty theft, theft of building material, on-selling of security information, or burglary and theft at neighbouring farms			
Receptor(s)	Construction site and surrounding properties			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Probable	2	Probable	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-4**	**Low**	**-2**
CUMULATIVE IMPACTS	**Additional construction activities will attract criminals**			
CONFIDENCE	Medium			
MITIGATION MEASURES	On-site security measures, such as perimeter fencing, controlled access and security guards			

12.1.8.4 *Social Impact 4 – Temporary employment*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Temporary employment (Construction Phase)**		**STATUS**	**POSITIVE**
Impact Description	People with different types and levels of skills will be required during construction.			
Impact Source(s)	New employment created due to construction of turbines and supporting infrastructure.			
Receptor(s)	Skilled, semi-skilled and low-skilled persons within the local area or further afield.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Short term	1		
PROBABILITY (C)	Definite	4		
INTENSITY OR MAGNITUDE (D)	Medium	+2		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+8**		
CUMULATIVE IMPACTS	**Additional construction activities will create more employment opportunities**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.8.5 *Social Impact 5 – Contribution towards local economic income*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Contribution towards local economic income (Construction Phase)**		**STATUS**	**POSITIVE**
Impact Description	The local and provincial economies and rest of the world will benefit from the additional spend.			
Impact Source(s)	Part of the initial capital investment, wages and salaries will create direct and indirect spending			
Receptor(s)	Local businesses that provide goods and services.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Short term	1		
PROBABILITY (C)	Definite	4		
INTENSITY OR MAGNITUDE (D)	Medium	+2		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+8**		
CUMULATIVE IMPACTS	**Additional construction activities will create more income for the local economy**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.8.6 *Social Impact 6 – Human health and well-being*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Human health and well-being (Operation Phase)**		**STATUS**	**NEGATIVE**
Impact Description	Noise and shadow flickering from turbines may affect nearby residents.			
Impact Source(s)	Large wind turbines may cause a low level of noise and shadow flickering.			
Receptor(s)	Surrounding land users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Improbable	1	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-6**	**Low**	**-3**
CUMULATIVE IMPACTS	**A number of turbines in the same area could be perceived negatively by sensitive residents**			
CONFIDENCE	Low			
MITIGATION MEASURES	Implement modern technology to reduce noise levels and place turbines more than 400 m from residential dwellings			

12.1.8.7 *Social Impact 7 – Education and training opportunities*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	Education and training opportunities (Operation Phase)		STATUS	POSITIVE
Impact Description	A WEF can provide education and training opportunities to local residents and learners			
Impact Source(s)	Wind energy is a highly specialised field that requires science and engineering skills			
Receptor(s)	Visitors and learners from nearby schools can visit the WEF to learn more about renewable energy			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Long term	3		
PROBABILITY (C)	Probable	2		
INTENSITY OR MAGNITUDE (D)	Medium	+2		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+12**		
CUMULATIVE IMPACTS	**A number of renewable energy developments could create economies of scale for specialised skills development programmes for local residents.**			
CONFIDENCE	Medium			
MITIGATION MEASURES	Not applicable			

12.1.8.8 *Social Impact 8 – Provision of renewable energy*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Provision of renewable energy (Operation Phase)**		**STATUS**	**POSITIVE**
Impact Description	The local community and rest of South Africa will benefit from the provision of renewable energy			
Impact Source(s)	Renewable energy will be created via 24 wind turbines			
Receptor(s)	Local community and the rest of South Africa			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Long term	3		
PROBABILITY (C)	Definite	4		
INTENSITY OR MAGNITUDE (D)	High	+3		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+36**		
CUMULATIVE IMPACTS	**The four approved/proposed WEFs in the Swellendam area will add at least 438 MW to the grid**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.8.9 *Social Impact 9 – Surrounding property values*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Surrounding property values (Operation Phase)**		**STATUS**	**POSITIVE**
Impact Description	A WEF can add or diminish the value of other properties in the immediate area			
Impact Source(s)	Land portions within the Overberg REDZ could be in higher demand, resulting in higher land values			
Receptor(s)	Surrounding property owners			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Long term	3	Long term	3
PROBABILITY (C)	Improbable	1	Improbable	1
INTENSITY OR MAGNITUDE (D)	Medium	+2	Low	+1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+6**		**3**
CUMULATIVE IMPACTS	**Multiple developments could negatively affect the sense of place and thus property prices**			
CONFIDENCE	Medium			
MITIGATION MEASURES	Mitigation in respect of sense of place (visual impact, etc.) will ensure that the value of surrounding properties is not negatively affected.			

12.1.8.10 *Social Impact 10 – Direct spending*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Direct spending (Operation Phase)**		**STATUS**	**POSITIVE**
Impact Description	The WEF will generate income for the local economy through ongoing operational expenses			
Impact Source(s)	Direct costs relate to the operational costs (such as land rental, insurance, power from the grid, repairs and maintenance, administration, etc.).			
Receptor(s)	The local, provincial and national economies will benefit from the operational spend.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Long term	3		
PROBABILITY (C)	Definite	4		
INTENSITY OR MAGNITUDE (D)	High	+3		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+36**		
CUMULATIVE IMPACTS	**Each additional development will further stimulate economic growth in the area**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.8.11 *Social Impact 11 – Creating new employment*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Creating new employment (Operation Phase)**		**STATUS**	**POSITIVE**
Impact Description	The WEF will generate a few permanent jobs for the duration of its economic life			
Impact Source(s)	Ongoing operations and maintenance at the site will create new employment			
Receptor(s)	Skilled technicians from the local area			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Long term	3		
PROBABILITY (C)	Highly probable	3		
INTENSITY OR MAGNITUDE (D)	Low	+1		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+9**		
CUMULATIVE IMPACTS	**Each additional development will create new employment opportunities**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.8.12 *Social Impact 12 – Revenue for local Municipality*

Based on the available information it is reasonable to suggest that this impact has **low positive** impact.

IMPACT NATURE	**Revenue for local Municipality (Operation Phase)**		**STATUS**	**POSITIVE**
Impact Description	The local municipality will receive income from property taxes on the land used for development			
Impact Source(s)	Property taxed on agricultural land			
Receptor(s)	Local municipality			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1		
DURATION (B)	Long term	3		
PROBABILITY (C)	Definite	4		
INTENSITY OR MAGNITUDE (D)	Medium	+2		
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**+24**		
CUMULATIVE IMPACTS	**Each additional development will create new employment opportunities**			
CONFIDENCE	High			
MITIGATION MEASURES	Not applicable			

12.1.9 Traffic Impacts

Based on the available information and the Traffic Assessment, the following impacts have been assessed in this Basic Assessment Report:

Construction Phase Impacts

- Increase in traffic volumes
- Gravel loss and possible damage to the road layer works

Operational Phase

- Increase in traffic volumes

Decommissioning Phase Impacts

- Decommissioning Activities

12.1.9.1 *Traffic Impact 1 – Construction Phase*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Increase in traffic volumes on the surrounding road network as a result of construction traffic**		**STATUS**	**NEGATIVE**
Impact Description	During the construction phase there will be an increase in traffic volumes on the surrounding road network that will impact on the general road users.			
Impact Source(s)	Construction Traffic			
Receptor(s)	General public/Road users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Highly probable	3	Probable	2
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-3**	**Low**	**-2**
CUMULATIVE IMPACTS	**Low**			
CONFIDENCE	High			
MITIGATION MEASURES	• Abnormal and heavy load vehicles should not be allowed on the public road network during the typical weekday a.m. and p.m. peak hours. • Abnormal load vehicles should be escorted by traffic officials to control traffic and limit possible conflicts at intersections. • These measures will be included in the Transport Management Plan			

12.1.9.2 *Traffic Impact 2 – Construction Phase*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Gravel loss and possible damage to the road layer works. as a result of additional truck traffic and heavy load truck traffic during the construction phase.**		**STATUS**	**NEGATIVE**
Impact Description	During the construction phase there will be gravel loss and possible damage to the road layer works along MR00268 and DR01251 as a result of additional truck traffic and heavy load truck traffic delivering equipment to the site.			
Impact Source(s)	Construction Traffic			
Receptor(s)	General public/Road users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Highly probable	3	Probable	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-6**	**Low**	**-2**
CUMULATIVE IMPACTS	**Low**			
CONFIDENCE	High			
MITIGATION MEASURES	• Resurfacing of sections along MR00268 and DR01251, where required and regular road maintenance i.e. grading of the road once every two weeks during the construction phase. • The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.			

12.1.9.3 *Traffic Impact 3 – Operational Phase*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Increase in traffic volumes on the surrounding road network.**		**STATUS**	**NEGATIVE**
Impact Description	During the operational phase there will be a slight increase in traffic volumes on the surrounding road network that might impact on the general road users and result in gravel loss along MR00268 and DR01251.			
Impact Source(s)	Operational Traffic			
Receptor(s)	General public/Road users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Highly probable	3	Probable	2
INTENSITY OR MAGNITUDE (D)	Low	-1	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-3**	**Low**	**-2**
CUMULATIVE IMPACTS	**Low**			
CONFIDENCE	High			
MITIGATION MEASURES	Routine road maintenance by the relevant Roads Authority.			

12.1.9.4 *Traffic Impact 4 – Decommissioning Phase*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Gravel loss and possible damage to the road layer works. as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase.**		STATUS	NEGATIVE
Impact Description	During the decommissioning phase there will be gravel loss and possible damage to the road layer works along MR00268 and DR1251 as a result of additional truck traffic and heavy load truck traffic removing equipment from the site.			
Impact Source(s)	Decommissioning Traffic			
Receptor(s)	General public/Road users			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Local	1	Local	1
DURATION (B)	Short term	1	Short term	1
PROBABILITY (C)	Highly probable	3	Probable	2
INTENSITY OR MAGNITUDE (D)	Medium	-2	Low	-1
SIGNIFICANCE RATING (F) = (A*B*D)*C	**Low**	**-6**	**Low**	**-2**
CUMULATIVE IMPACTS	**Low**			
CONFIDENCE	High			
MITIGATION MEASURES	• Resurfacing of sections along MR00268 and DR01251, where required and regular road maintenance i.e. grading of the road once every two weeks during the decommissioning phase. • The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.			

12.1.10 Visual Impacts

Based on the available information and the Visual Assessment, the following impacts have been assessed in this Basic Assessment Report:

a) The proposed development could change the character and sense of place of the landscape setting;

b) The proposed development could change the character of the landscape as seen from the R319, the N2 and local roads;

c) The proposed development could change the character of the landscape as seen from the Bontebok National Park;

d) The proposed development could change the character of the landscape as seen from Swellendam;

e) The proposed development could change the character of the landscape as seen from local homesteads;

f) Local homesteads could be affected by shadow flicker; and

g) Lighting impacts.

12.1.10.1 *Visual Impact A*

Based on the available information it is reasonable to suggest that this impact has **medium negative** impact.

IMPACT NATURE	Impact – Nature of Impact Loss of Rural Character / Sense of Place		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the surrounding rural landscape character			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Surrounding landscape			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	4
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation Alternative:	-2	Switching Substation Alternative:	-2
	Loop in / Loop out Alternative:	-1.75	Loop in / Loop out Alternative:	-1.75
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation Alternative:	**-64 (Medium)**	Switching Substation Alternative:	**-48 (Medium)**
	Loop in / Loop out Alternative:	**-56 (Medium)**	Loop in / Loop out Alternative:	**-42 (Medium)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	The proposed WEF will extend the area of the rural landscape where the character is influenced by industrial elements. This will reduce the sense of place.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

12.1.10.2 *Visual Impact B*

Based on the available information it is reasonable to suggest that this impact has **medium negative** impact.

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from the R319		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the road.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Users of the road			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	4
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation Alternative:	-2	Switching Substation Alternative:	-2
	Loop in / Loop out Alternative:	-1.75	Loop in / Loop out Alternative:	-1.75
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation Alternative:	**-64 (Medium)**	Switching Substation Alternative:	**-48 (Medium)**
	Loop in / Loop out Alternative:	**-56 (Medium)**	Loop in / Loop out Alternative:	**-42 (Medium)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	The proposed WEF will extend the section of the road from which the rural landscape character will be industrialised.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from the N2		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the road.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Users of the road			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-1	Switching Substation & Loop in / Loop out Alternatives:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-8 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-6 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	The proposed WEF will extend the section of the road from which the rural landscape character will be industrialised.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

IMPACT NATURE	Impact – Nature of Impact **Change in the character of views from local roads in the vicinity of the WEF**		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the road.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Users of the road			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	4
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation Alternative:	-3	Switching Substation Alternative:	-3
	Loop in / Loop out Alternative:	-3.5	Loop in / Loop out Alternative:	-3.5
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation Alternative:	**-96 (High)**	Switching Substation Alternative:	**-72 (Medium)**
	Loop in / Loop out Alternative:	**-112 (High)**	Loop in / Loop out Alternative:	**-84 (High)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	The proposed WEF will extend the section of the road from which the rural landscape character will be industrialised.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

12.1.10.3 *Visual Impact C*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from higher sections of the Bontebok National Park		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the National Park.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Visitors to the National Park			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-2	Switching Substation & Loop in / Loop out Alternatives:	-2
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-32 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-24 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	Other WEFs are not visible from the Park. Therefore, there will be no cumulative impact.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from lower sections of the Bontebok National Park close to the Breede River		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the National Park.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Visitors to the National Park			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-1	Switching Substation & Loop in / Loop out Alternatives:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-8 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-6 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	Other WEFs are not visible from the Park. Therefore, there will be no cumulative impact.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

12.1.10.4 *Visual Impact D*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Impact – Nature of Impact Change in the character of views from within the town of Swellendam**		**STATUS**	**NEGATIVE**
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from the National Park.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Visitors to the National Park			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-1	Switching Substation & Loop in / Loop out Alternatives:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-8 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-6 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	Other WEFs are not visible from the Park. Therefore, there will be no cumulative impact.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

12.1.10.5 *Visual Impact E*

Based on the available information it is reasonable to suggest that this impact has **medium negative** impact.

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from local homesteads within 4km of the WEF		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from homesteads.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Residents of homesteads			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	3	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation Alternative:	-3	Switching Substation Alternative:	-3
	Loop in / Loop out Alternative:	-3.25	Loop in / Loop out Alternative:	-3.25
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation Alternative:	**-72 (Medium)**	Switching Substation Alternative:	**-54 (Medium)**
	Loop in / Loop out Alternative:	**-78 (Medium)**	Loop in / Loop out Alternative:	**-58.5 (Medium)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	Other WEFs are not visible from the closest homesteads. Therefore, there will be no cumulative impact.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

IMPACT NATURE	Impact – Nature of Impact Change in the character of views from local homesteads outside 4km of the WEF		STATUS	NEGATIVE
Impact Description	The proposed WEF and associated infrastructure could detract from the rural character of views from homesteads.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Residents of homesteads			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	2
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	1.5	Switching Substation & Loop in / Loop out Alternatives:	1.5
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-1.5	Switching Substation & Loop in / Loop out Alternatives:	-1.5
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-18 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-13.5 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	Other WEFs are not visible from the closest homesteads. Therefore, there will be no cumulative impact.			
CONFIDENCE	High			
MITIGATION MEASURES	No mitigation is possible during the operational phase. During decommissioning ensure removal of turbine structures / infrastructure and undertake effective rehabilitation returning the landscape to productive agriculture.			

12.1.10.6 *Visual Impact F*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Impact – Nature of Impact Shadow flicker**		**STATUS**	**NEGATIVE**
Impact Description	Shadow flicker affecting residents of homesteads within a distance equivalent to 10x the diameter of turbines.			
Impact Source(s)	The introduction of industrial elements including wind turbines and electrical infrastructure			
Receptor(s)	Residents of homesteads			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-3	Switching Substation & Loop in / Loop out Alternatives:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-24 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-3 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	No cumulative impact			
CONFIDENCE	Medium			
MITIGATION MEASURES	Monitor homesteads for the effects of shadow flicker through regular discussion with residents over a minimum period of 12 months. Should shadow flicker be reported ensure that the turbine / turbines causing the shadow flicker is / are programmed to turn off during the periods when shadow flicker is reported.			

12.1.10.7 *Visual Impact G*

Based on the available information it is reasonable to suggest that this impact has **low negative** impact.

IMPACT NATURE	**Impact – Nature of Impact Lighting impact**		**STATUS**	**NEGATIVE**
Impact Description	Nuisance caused by overspill lighting.			
Impact Source(s)	Security and operational lighting particularly of substations and control facilities / workshop			
Receptor(s)	Residents of adjacent homesteads.			
PARAMETER	**WITHOUT MITIGATION**	**SCORE**	**WITH MITIGATION**	**SCORE**
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	2	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation Alternative:	-2	Switching Substation Alternative:	-1
	Loop in / Loop out Alternative:	-1.5	Loop in / Loop out Alternative:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation Alternative:	**-16 (Low)**	Switching Substation Alternative:	**-3 (Low)**
	Loop in / Loop out Alternative:	**-12 (Low)**	Loop in / Loop out Alternative:	**-3 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	No cumulative impact			
CONFIDENCE	Medium			
MITIGATION MEASURES	• Use low key lighting around buildings and operational areas that is triggered only when people are present. • Plan to utilise infra-red security systems or motion sensor triggered security lighting; • Ensure that lighting is focused on the development with no light spillage outside the site; and • Keep lighting low, no tall mast lighting should be used.			

IMPACT NATURE	Impact – Nature of Impact Lighting impact		STATUS	NEGATIVE
Impact Description	Spoiling of the night time environment.			
Impact Source(s)	Aircraft warning lights on each turbine.			
Receptor(s)	Visitors staying in the Bontebok National Park.			
PARAMETER	WITHOUT MITIGATION	SCORE	WITH MITIGATION	SCORE
EXTENT (A)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
DURATION (B)	Switching Substation & Loop in / Loop out Alternatives:	4	Switching Substation & Loop in / Loop out Alternatives:	3
	No-Go Alternative:	0	No-Go Alternative:	0
PROBABILITY (C)	Switching Substation & Loop in / Loop out Alternatives:	1	Switching Substation & Loop in / Loop out Alternatives:	1
	No-Go Alternative:	0	No-Go Alternative:	0
INTENSITY OR MAGNITUDE (D)	Switching Substation & Loop in / Loop out Alternatives:	-1	Switching Substation & Loop in / Loop out Alternatives:	-1
	No-Go Alternative:	0	No-Go Alternative:	0
SIGNIFICANCE RATING (F) = (A*B*D)*C	Switching Substation & Loop in / Loop out Alternatives:	**-4 (Low)**	Switching Substation & Loop in / Loop out Alternatives:	**-3 (Low)**
	No-Go Alternative:	**0**	No-Go Alternative:	**0**
CUMULATIVE IMPACTS	No cumulative impact as aircraft warning lights from other WEF projects are not visible from Bontebok			
CONFIDENCE	High			
MITIGATION MEASURES	The visitor camp is located in the lower northern section of the Park adjacent to the Breede River. Red aircraft warning lights will be located on the top of each turbine nacelle which is located at the top of each tower. The assessment indicates that whilst the top of a small number of turbines could be visible, it is unlikely that the towers / nacelles will be visible from areas beside the river. No mitigation is therefore necessary.			

12.2 SUMMARY OF POTENTIAL IMPACTS

Summary table of overall Significance (for each impact identified):

Clarification of "Status Quo"

The no-go alternative will result in the current status quo being maintained as far as the environmental impacts are concerned. The no-go option would therefore eliminate any additional impact on the ecological integrity of the proposed development site. It should be noted though that the project is heavily transformed which has already had a detrimental impact on the environment.

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	**Preferred Alternative**
Construction Phase		
Agricultural Impact 1 – Construction in proximity to natural drainage lines	Status quo	Low -
Agricultural Impact 2 – Removal of or damage to natural vegetation	Status quo	Low -
Agricultural Impact 3 – Degradation of natural resource: soil	Status quo	Low -
Agricultural Impact 4 – Disturbance to flow pattern of run-off water	Status quo	Low -
Avifaunal Impact 1 – Displacement of priority avifauna	Status quo	Low -
Bat Impact 1 – Roost Disturbance	Status quo	Low -
Bat Impact 2 – Roost Destruction	Status quo	Low -
Bat Impact 3 – Habitat Modification	Status quo	Low -
Bat Impact 4 – Light Pollution	Status quo	Low -
Botanical Impact 1 – Loss of natural and partly natural vegetation	Low -	Low -

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	**Preferred Alternative**
Freshwater Impact 1 – Construction and operation of WEF	Low -	Low -
Freshwater Impact 2 – Construction and operation of roads within the WEF	Low -	Low -
Heritage Impact 1 – Destruction of the cultural landscape	Status quo	Low -
Heritage Impact 2 – Destruction of archaeological heritage	Status quo	Low -
Heritage Impact 3 – Destruction of palaeontological heritage	Status quo	Low -
Noise Impact 1 - Construction Activities (Construction Phase)	Low -	Low -
Social Impact 1 - Nuisance factors - dust and noise	Status quo	Low -
Social Impact 2 - Influx of job seekers	Status quo	Low -
Social Impact 3 - Increase in local crime	Status quo	Low -
Social Impact 4 - Temporary employment	Status quo	Low +
Social Impact 5 - Contribution towards local economic income	Status quo	Low +
Traffic Impact 1 – Construction Phase	Low -	Low -
Visual Impacts – Construction Phase	Status quo	Medium-
Operational Phase		
Agricultural Impact 1 – Reduction of natural resource: soil	Status quo	Low -

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	Preferred Alternative
Agricultural Impact 2 – Disturbance to flow pattern of run-off water	Status quo	Low -
Agricultural Impact 3 – Abstraction of groundwater	Status quo	Low -
Agricultural Impact 4 – Aerial crop spraying	Status quo	Low -
Avifaunal Impact 1 – Mortality of priority avifauna and Cape Vultures (Turbine Collisions)	Status quo	Low -
Avifaunal Impact 2 – Mortality of priority avifauna and Cape Vultures (Substation electrocution)	Status quo	Low -
Avifaunal Impact 3 – Mortality of priority avifauna and Cape Vultures (132kV grid electrocution)	Status quo	Low -
Avifaunal Impact 4 – Mortality of priority avifauna and Cape Vultures (132kV grid collisions)	Status quo	Low -
Bat Impact 1 – Habitat Creation in High-Risk Locations	Status quo	Low -
Bat Impact 2 – Mortality during commuting and/or foraging	Status quo	Low -
Bat Impact 3 – Mortality during migration	Status quo	Medium -
Bat Impact 4 – Light Pollution	Status quo	Low -
Noise Impact 2 - Operational Noise (Operational Phase)	Low -	Low -
Social Impact 1 - Human health and well-being	Status quo	Low -

DESCRIPTION OF IMPACT	Overall Significance (With Mitigation)	
	No-Go Alternative	Preferred Alternative
Social Impact 2 - Education and training opportunities	Status quo	Low +
Social Impact 3 - Provision of renewable energy	Status quo	Low +
Social Impact 4 - Surrounding property values	Status quo	Low +
Social Impact 5 - Direct spending	Status quo	Low +
Social Impact 6 - Creating new employment	Status quo	Low +
Social Impact 7 - Revenue for local Municipality	Status quo	Low +
Traffic Impact 1 – Operational Phase	Low -	Low -
Visual Impacts – Operational Phase	Status quo	Medium-
Cumulative Impacts		
Avifaunal Impact 1 – Mortality of priority avifauna and Cape Vultures	Status quo	Medium -
Bat Impact 1 – Cumulative Impacts	Low -	Low -
Botanical Impact 1 – Cumulative Impacts	Low -	Low -
Freshwater Impact 1 – Cumulative Impacts	Low -	Low -

* Cumulative Overall Findings as inferred from the Specialist Report. The highest impact level identified by the specialist is used.

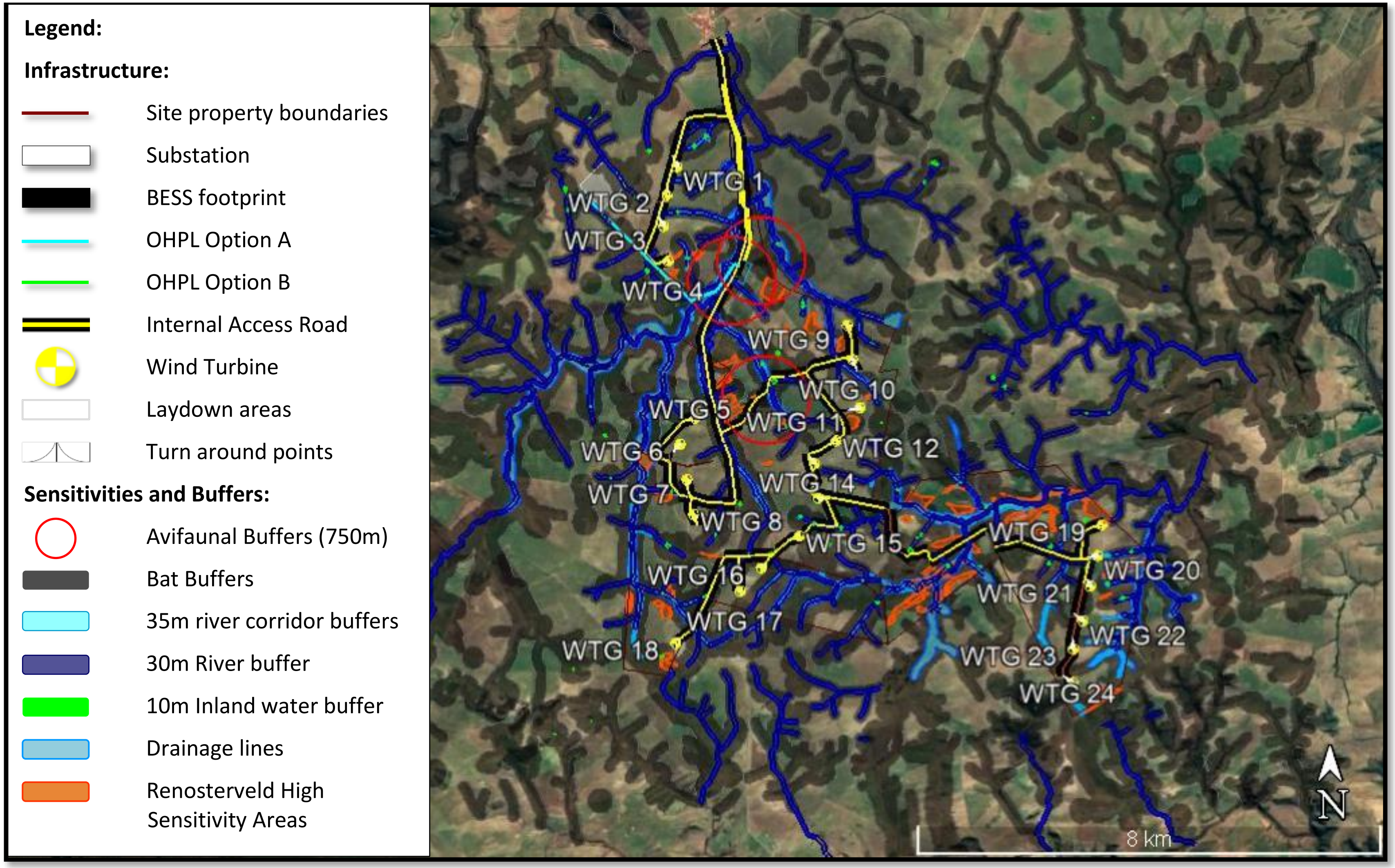


Figure 12.1: Map of the full WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 12.2: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 12.3: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

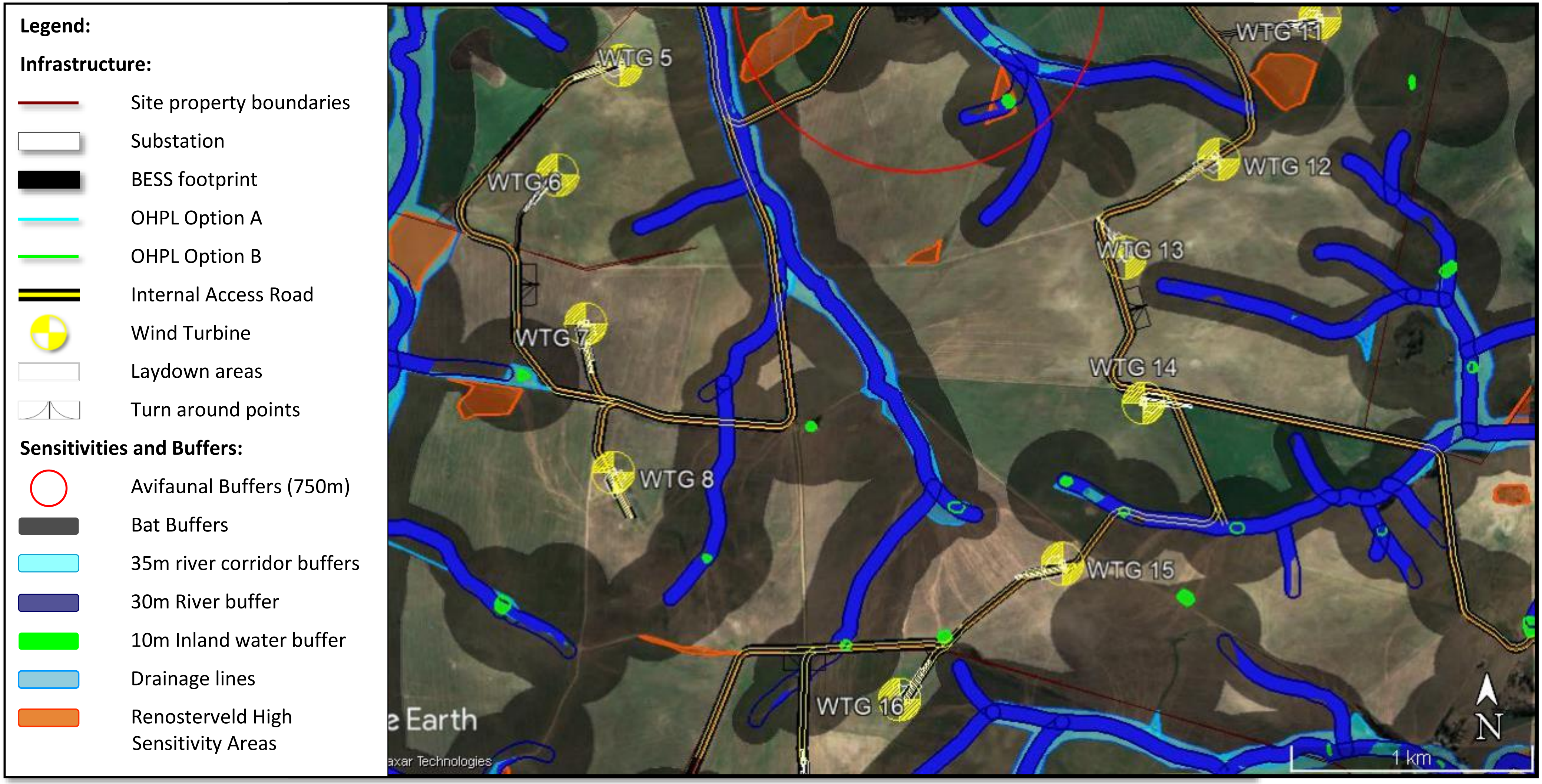


Figure 12.4: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

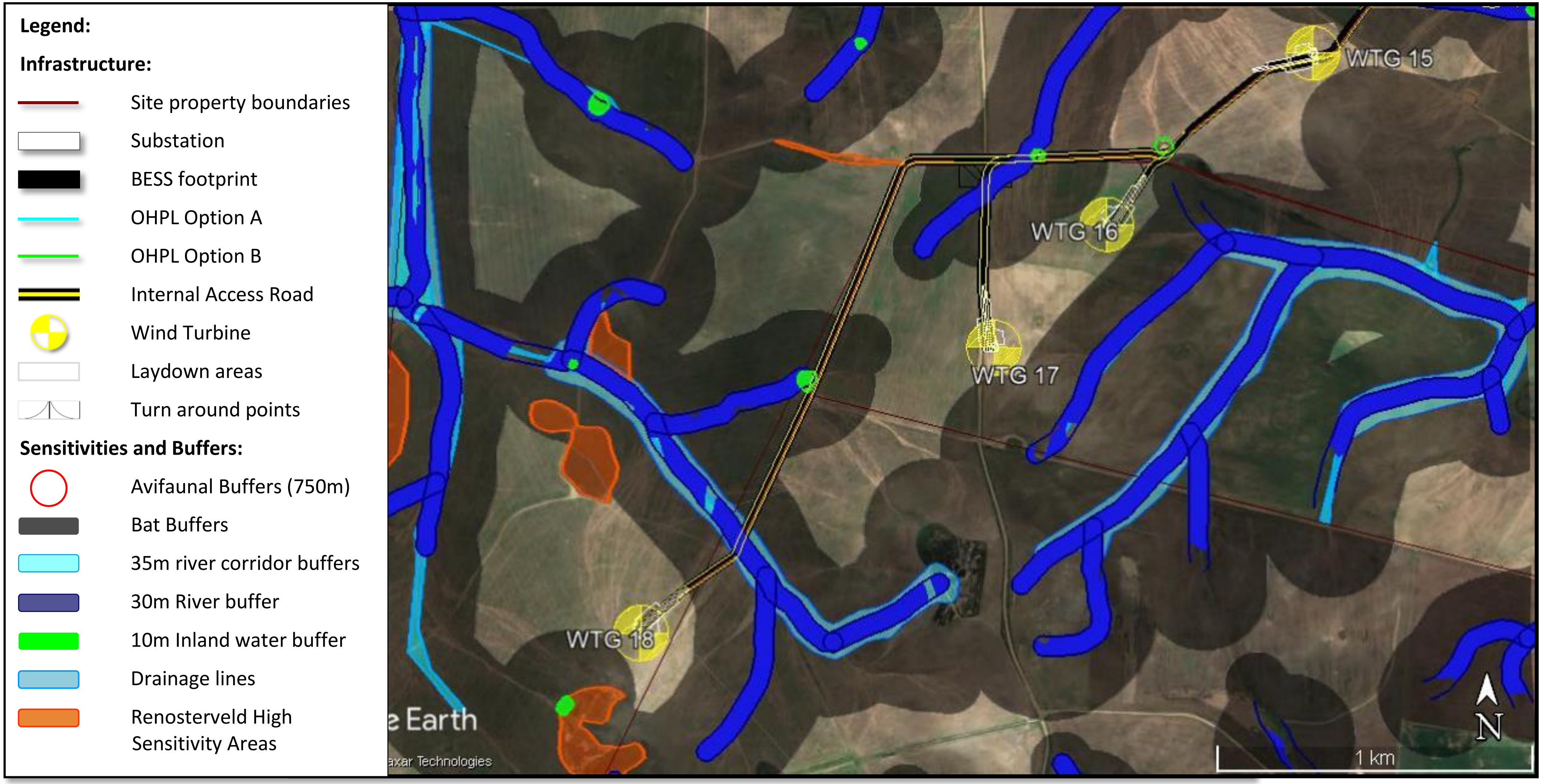


Figure 12.5: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

Figure 12.6: Map of a subsection of the WC WEF Site showing the proposed Layout superimposed over the environmental sensitivities, indicating any areas that should be avoided, including buffers.

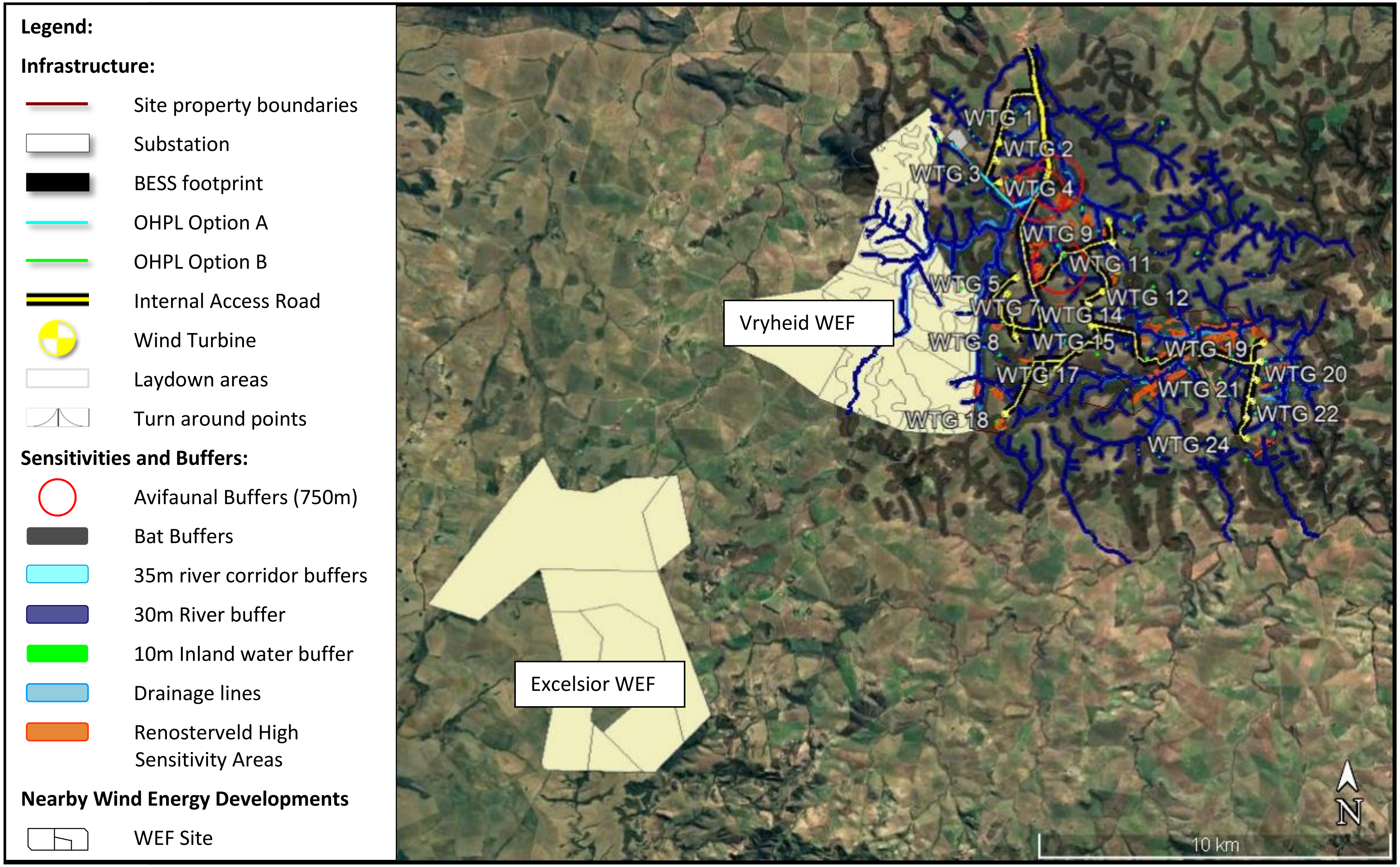


Figure 12.7: Map of the WC WEF Site showing the proposed Layout, the environmental sensitivities, buffer zones and the surrounding Wind Energy Facilities being developed that were used to assess the cumulative environmental impacts

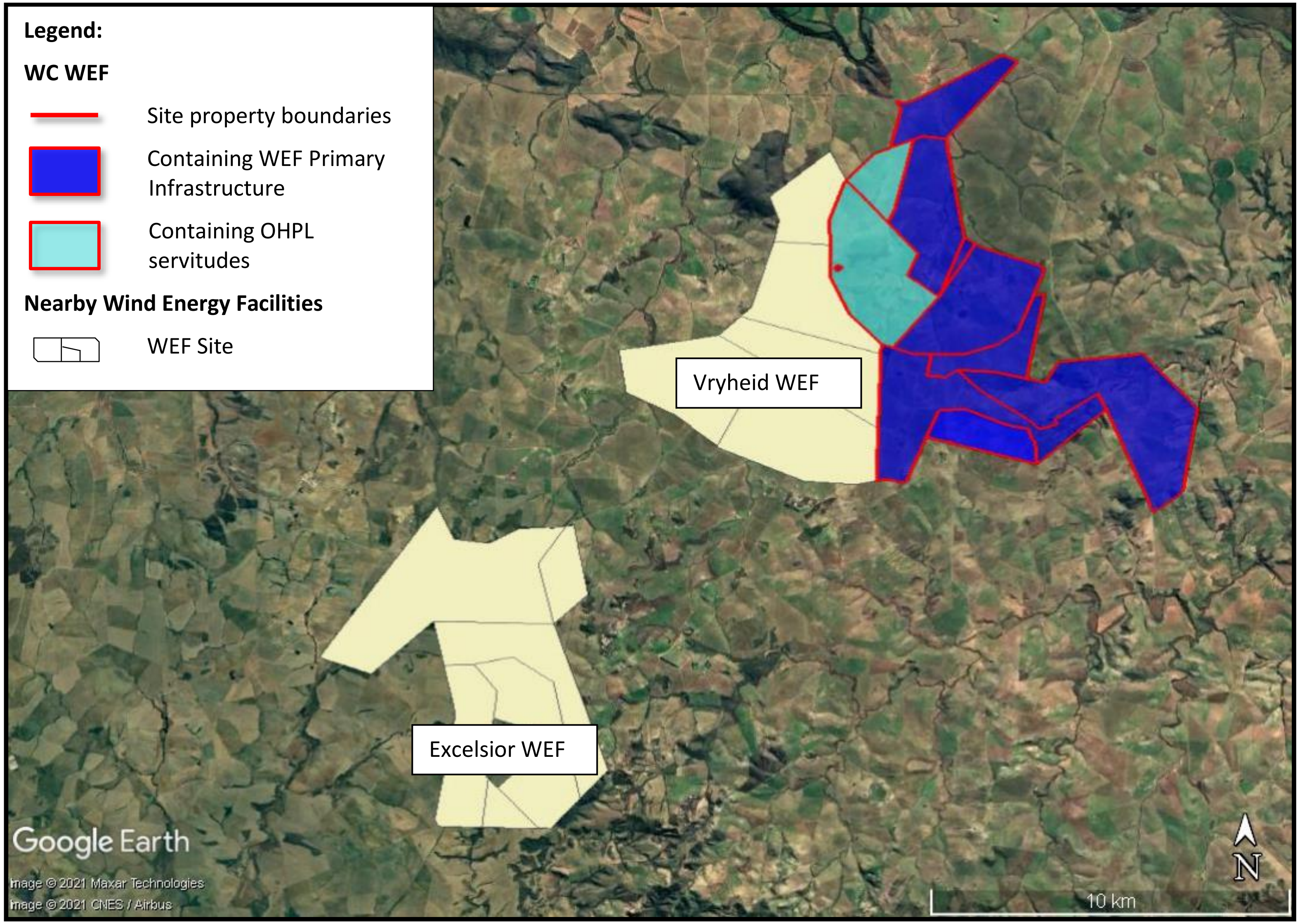


Figure 12.8: Map of the WC WEF Site relative to the surrounding Wind Energy Facilities being developed that were used to assess the cumulative environmental impacts

13 BULK SERVICES (E.G. SEWAGE, WATER, ELECTRICITY AND SOLID WASTE)

13.1 ROADS

Maximum use of both the existing servitudes and the existing roads shall be made in order to gain access to construction sites and the servitude. Any area outside the servitude area required to facilitate access, construction activities, construction camps or material storage areas, shall be negotiated with the affected Landowner and written agreements shall be obtained. All activities are proposed for land owned by the applicant, so it is unlikely additional access will be required.

13.2 WATER

No access to bulk water services are required.

13.3 ELECTRICITY

Based on the available information, it is evident that electricity services are already in place and are located on site. Should additional electricity be required during the construction phase, the Applicant has advised that generator sets will be placed on site.

13.4 SEWAGE

Based on the available information, bulk sewage services are not required on site. During the construction phase, portable/chemical toilets will have to be established in order to ensure that enough hygienic facilities will be made available for all workers employed on the site.

13.5 SOLID WASTE

Based on the available information, the proposed Western Cape WEF will not require access to bulk solid waste services for operation. During construction, the Applicant has confirmed that any solid waste accumulated will be disposed off site by a licensed contractor into a legal and licensed landfill site.

14 PUBLIC PARTICIPATION PROCESS

In accordance with ***Appendix 1 Regulation 2(h)(ii, iii) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)****, the following information is presented in Section 12:*

> ***2(h) ii*** *– Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs*
> ***2(h) iii*** *– A summary of the issues raised by interested and affected parties and an indication of the manner in which the issues were incorporated or the reasons for not including them.*

14.1 OBJECTIVES OF THE PUBLIC PARTICIPATION PROCESS

The public consultation process is required by the NEMA EIA Regulations (2014, as amended) GNR 326 Regulation 41. The Regulation aims to ensure that all information pertaining to this Environmental Permitting Process is adequately circulated to all Interested and Affected Parties (I&APs) and further provides the I&APs with timeframes within which to provide feedback throughout the Basic Assessment process. This PPP thus aims at providing organisations and individuals with an opportunity to raise concerns and make comments and suggestions regarding the proposed Project. By being part of the assessment process, stakeholders have the opportunity to influence the Project layout and design as well as the plan of study of the BAR.

The principles for the Final BAR that determine communication with all I&APs at large are included in the principles of the NEMA and are further highlighted in the DEA&DP EIA Guideline and Information Document Series (March 2013) which states that: "*Public participation process means a process by which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to an application*."

The purpose of the Public Participation Process (PPP) is to provide sufficient and accessible information, in an objective manner.

<u>To enable I&APs to:</u>

- Understand the context of the Amendment Report.
- Become informed and educated about the proposed project and its potential impacts.
- Raise issues of concern and suggestions for enhanced benefits.
- Contribute relevant local information and traditional knowledge to the environmental assessment.

14.2 STEPS TAKEN TO NOTIFY POTENTIALLY INTERESTED AND AFFECTED PARTIES

14.2.1 *Pre-Application Phase Public Participation Process*

Identification of Stakeholders

A stakeholder database, compliant with Regulation 42 of the EIA Regulations, including all relevant commenting authorities, conservation bodies, landowners and adjacent landowners has been compiled. These stakeholders were notified via written notice (email) of the draft Basic Assessment Report for a 30-day comment period. In terms of the NEMA EIA Regulations (2014, as amended), notification of directly adjacent landowners and occupiers is required. The EAP is satisfied that the Public Participation Process was consistent with the requirements of Regulations.

Communication with Stakeholders

- In terms of the NEMA EIA Regulations (2014, as amended), potential I&APs were given 30 calendar days within which to register as an I&AP (initial notification) and provide comment.
- The initial commenting period commenced on 23 August 2021 and concluded on 21 September 2021.
- All issues and concerns raised by I&APs during the above-mentioned commenting period were recorded and addressed in the Comments and Responses Report.
- Site notice boards (with minimum dimensions of 60cm X 42cm) in English were erected on the project site boundary (at strategic viewable locations).
- Newspaper advertisements (in English) were be placed in one local newspaper (Langeberg Bulletin) and one provincial newspaper (Cape Argus).
- The draft BAR for pre-application public comment was made available to registered stakeholders through an online electronic link (One Drive).
- Please refer to **Appendix E** for copies of the contents of these documents.
- Please refer to **Appendix E** for a full account of stakeholders notified as part of this public participation process.

The above listed **Public Participation Plan** (in accordance with the **new EIA Directions dated 05 June 2020**) was approved by DFFE on 16 August 2021.\

Comments received during this public consultation were recorded in the **Comments and Response Report** dated September 2021, included in **Appendix E** of this Final BAR. Comments received were responded to by the EAP, Applicant and specialists as required.

14.2.2 *Application Phase Public Participation Process* – (Current Phase)

Identification of Stakeholders

A registered stakeholder database, compliant with Regulation 42 of the EIA Regulations, including all relevant commenting authorities, conservation bodies, landowners and adjacent landowners has been compiled during the Pre-Application Phase PPP. These registered stakeholders will be notified via written notice (email) of the Basic Assessment Application and the availability of the Final Basic Assessment Report for a 30-day comment period. In terms of the NEMA EIA Regulations (2014, as amended), notification of directly adjacent landowners and occupiers is required. The EAP is satisfied that the Public Participation Process will be consistent with the requirements of Regulations.

Communication with Stakeholders

- In terms of the NEMA EIA Regulations (2014, as amended), registered I&APs will be given 30 calendar days within which to provide comment.
- The commenting period commences on **04 October 2021** and concludes on **02 November 2021.**
- All issues and concerns raised by I&APs during the above-mentioned commenting period will be recorded and addressed in the Comments and Responses Report, to be submitted with the previous Comments and Response Report and the Final BAR for Decision.
- The final BAR for public comment will be made available to registered stakeholders through an online electronic link (One Drive or similar). If there are any registered stakeholders that cannot access the electronic report, hard copies or CDs will be couriered to them upon request. For hard copies/CDs, strict COVID measures will be implemented to ensure that the documentation is sanitized prior to distribution.
- Please refer to **Appendix E** for copies of the contents of these documents.
- Please refer to **Appendix E** for a full account of stakeholders notified as part of this public participation process.
- The final BAR for decision-making purposes will be submitted to the Competent Authority during November 2021, providing that no contentious issues are raised during PPP.

Site notices and newspaper advertisements were excluded from this PPP in terms of Regulation 41(5) of NEMA EIA Regulations (2014, as amended) as they were included in the pre-application PPP (from 23 August 2021 up to and including September 2021). Proof of the previous PPP process, notifications and the Comments and Responses Report are included in **Appendix E**.

14.3 AUTHORITY CONSULTATION

The following Commenting Authorities have been consulted with on the project as part of the BAR for the PPP:

- Birdlife SA
- Cape Nature
- Overberg District Municipality
- Department of Economic Development and Tourism
- Department of Forestry, Fisheries and the Environment (DFFE)
- Department of Local Government & Housing: Provincial Disaster Management Centre
- Department of Water & Sanitation (DWS)
- Dept of Agriculture, Forestry and Fisheries
- ESKOM
- Heritage Western Cape
- National Energy Regulator of South Africa (NERSA)
- SANPARKS
- SANRAL
- South African Civil Aviation Authority (CAA)
- South African Heritage Resource Agency (SAHRA)
- Telkom
- Breede-Gouritz Catchment Management Agency
- Western Cape Department of Agriculture
- Western Cape Department of Environmental Affairs & Development Planning (DEA&DP)
- Western Cape Department of Transport
- Wildlife and Environment Society of South Africa (WESSA)
- Swellendam Local Municipality

14.4 PROOF OF NOTIFICATION

A copy of the contents of the site notices, adverts and notification letters is contained in Appendix E.

14.5 LIST OF REGISTERED INTERESTED AND AFFECTED PARTIES (I&AP'S)

A list containing contact details of all persons initially notified is contained in Appendix E (Public Participation Information).

15 NEXT STEPS IN THE ENVIRONMENTAL APPLICATION PROGRAMME

Once the statutory 30-day PPP has completed for this BAR for comment, the BAR for decision-making purposes will be finalised and will contain a Comments and Responses Report, which addresses and registers all comments raised during this initial PPP. BAR for decision-making purposes will be submitted for a decision to the Competent Authority.

This BAR is anticipated to be submitted to the Competent Authority for decision in November 2021.

16 REQUIRED INFORMATION REQUESTED BY THE COMPETENT AUTHORITY

*In accordance with **Appendix 1 Regulation 3(t) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

Any specific information that may be required by the competent authority

No specific information request has been received for inclusion in this section.

17 ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

*In accordance with **Appendix 1 Regulation 3(o) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended)**:*

A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

Based on the available information assessed during the Scoping Phase, it is reasonable to suggest that the following assumptions and limitations have been used throughout this Report:

- That the information provided by the specialists, Applicant and developer are true and correct.
- That the applicant will act in a responsible manner and take appropriate and prompt action when incidents occur at the site, in order to (1) determine the cause of the incident and, (2) rectify the cause of the problem.
- That the development will be used for the activities proposed.
- That the information provided by the applicant and the specialists are deemed accurate and unbiased.
- That the applicant will adhere to the mitigation measures presented in this BAR and EMPr.
- That the full recommendations of the specialist studies are implemented.
- That the monitoring and auditing programmes suggested are implemented.
- That decommissioning activity, should this be required, will be conducted by experienced person/s (contractors and principle agents).
- That an experienced independent environmental control officer (ECO) will be appointed for the construction phase of this project and that regular ECO site visits will occur to ensure that the EMPr is complied with and that every effort is made to minimise environmental impacts.

18 EAP OPINION AND RECOMMENDATIONS AND CERTAIN CONDITIONS ADOPTED AS PART OF THE ENVIRONMENTAL AUTHORISATION

*In accordance with **Appendix 1 Regulation 3(n), 3(p) and 3(q) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended**):*

> ***3(n)*** *- Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation*
>
> ***3(p)*** *- A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;*
>
> ***3(q)*** *- Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;*

The investigation of potential environmental impacts associated with the proposed Western Cape WEF indicates that, whilst there are several negative environmental impacts associated with the proposed development, there are **no significant impacts** resulting from the proposed WEF. Where **negative impacts have been identified these have been suitably mitigated**. The proposed Western Cape WEF do represent **a number of significant positive opportunities**, notably an addition of 140MW to the national grid, new employment opportunities, economic income and associated business development.

18.1 EAP OPINION AND RECOMMENDATION

Based on the information presented in this BAR, as informed by the statutory requirements, independent expert studies, public consultation, commenting authorities and the competent authority, the findings of this Basic Assessment indicate that the project, in the form of the preferred alternative, (read strictly in conjunction with the mitigation measures stipulated in Section 18.2 of this BAR as well as the attached EMPr, which must form part of the conditions of the EA) **will not result in unacceptable negative impacts.**

The EAP opinion and recommendations are based on the following:

- The site is located within one of the gazetted Renewable Energy Development Zones (REDZ). The REDZ are zones that have been identified by the DEA in consultation with an independent professional team, which comprised of Visual, Bird, Bat, Biodiversity, Socio-Economic, Archaeological, Palaeontological and Freshwater Consultants and whom provided inputs to identify these REDZs.

- The construction of the Western Cape WEF as well as the supporting overhead powerline, substation, BESS and access roads address a national and regional need for the generation of clean, renewable energy and greater access to electricity through the construction of necessary infrastructure. This goal is reflected in national plans and policies as well as regional SDFs, IDPs and Development Programmes. The project site has been earmarked and authorised for renewable energy generation and its associated infrastructure.

- Based on this and the outcome of the specialist impact assessments, it is evident that the Preferred Layout Alternative is the only reasonable and feasible layout alternative, which can be implemented on the site.

The Preferred Alternative is the most feasible and reasonable alternative and has been comparatively assessed against the No-Go Alternative in this Report. Please kindly refer to Section 12 for the impact assessment.

In conclusion and based on:

i. the Specialist Study Findings undertaken by the professional team appointed to this this Project and represented in Section 8 of this BAR.
ii. the assessment undertaken by the EAP in conjunction with the specialist findings and represented in Section 08 and 12 of the BAR.
iii. the motivation of Alternatives in Section 9.

It is reasonable to suggest the overall impact associated with the proposed Western Cape WEF and associated infrastructure will be mitigated to an acceptable environmental level and **therefore it is reasonable to suggest that there is no reason why the Competent Authority should not authorise the preferred alternative.**

In conclusion, no fatal flaws related to the impacts of the Western Cape WEF were identified at this stage.

18.2 CERTAIN CONDITIONS TO FORM PART OF THE ENVIRONMENTAL AUTHORISATION

General recommendations that should be considered by the relevant authority are listed below:

- A habitat management plan, as per comments from Cape Nature, must be compiled as part of the EMPr approval process.
- The EMPr must be followed for the lifecycle of the development and the decommissioning phase must be monitored by a suitably experienced ECO.
- The area of the dolerite outcrop proposed for development must be assessed for rock art and rock engravings (significant archaeological heritage prior to construction activities.
- Regular auditing (e.g. every 12 months) by an experienced, suitably qualified, independent environmental professional must be undertaken to ensure that the conditions of the EMPr, which are related to the key findings of the specialists and this EIA, are implemented. This will ensure that the design intent of the development is carried through the lifecycle of the development. This should include, but not necessarily be limited to, provision for specialist consultation in the case of water quality monitoring, visual impact monitoring and wetland environments monitoring.
- No advertising of any nature is allowed on the turbine structures.
- A noise management plan needs to be developed as part of the EMPr approval process.

Please refer to the Sections 8 and 12, as well as the EMPr, for specific mitigation measures.

Based on the environmental permitting process and rigorous professional assessments undertaken for this project to date, there is no reason to suggest that the Preferred Alternative cannot be authorised for implementation.

The applicant would like to apply for a validity period of 10 years in which to start construction. This would allow the applicant to participate in multiple BID rounds without having to apply for unnecessary extensions. The receiving environment is unlikely to change as it is active agricultural land uses.

Further, this BAR and supporting documentation is considered to be adequate in meeting the requirements of the relevant legislation and those of the Competent Authority and the EAP believes that sufficient information is presented for the purposes of decision-making.

In this regard, no further studies are envisaged.
Reviewed by the following individuals:

- Johann Kilian
- Evan Milborrow
- Fabio Venturi

19 OATH OF EAP UNDERTAKING ASSESSMENT

In accordance with ***Appendix 1 Regulation 3(r) of GN No. R. 326 of the NEMA EIA Regulations (2014, as amended****), the following information is presented in Section 16.*

R3(r) *– An undertaking under oath of affirmation by the EAP in relation to:*

> ***R3(r) (i)*** *– The correctness of the information provided in the reports*
>
> ***R3(r) (ii)*** *– The inclusion of comments and inputs from stakeholders and I&APs*
>
> ***R3(r) (iii)*** *– The inclusion of inputs and recommendations form the specialist reports where relevant; and*
>
> ***R3(r) (iv)*** *– Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.*