




SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

Proposed Development of the Kraaltjies Wind Energy Facility (WEF) and Associated Infrastructure near Beaufort West in the Western Cape Province

Final Environmental Impact Report

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KEY PROJECT INFORMATION

Component	Description / Dimensions
Location of site (centre point)	32°52'47.24"S 22°34'48.12"E
Project site – Total extent of the affected property	3, 994.9ha
Total extent of the Development Footprint	40 ha
Number of Turbines	20 turbines
Turbine development area	Hard standing Area = 90m x 50m x up to 20 turbines
SG codes	C00900000000037400010 C00900000000037400025
Export capacity	Up to 240 megawatts
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	Up to 120m to 200m
Rotor diameter	Up to 200m
Substation and O&M building area and guard house	The on-site substation will include both the IPP portion (2 ha) and Eskom portion (2 ha) of the total substation area (4 ha) which is located within the greater 25 ha substation assessment area. The IPP portion will be included in the 11-33kV portion/yard of the on-site substation. The O&M building will be 2 ha in extent
Construction laydown area	Approximately 3ha
Hard stand areas	Approximately 4 500m ²
Battery Energy Storage System (BESS)	A Battery Energy Storage System (BESS) will be located next to the onsite 11-33/132kV substation within the greater 25 ha substation assessment area. Lithium-ion technology will be used. The BESS will be up to 4 ha in extent. A Battery Energy Storage System (BESS) will be located next to the onsite 11-33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.
Width of internal access roads	The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. During operation, internal roads with a width of up to approximately 6m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever

Component	Description / Dimensions
	possible, although new site roads will be constructed where necessary.
Length of internal access roads	Approximately 21km in length
Site Access / Internal Roads	<p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e., for bringing in transformers etc), after construction they will be rehabilitated back down to 8m – 12m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via a dirt road off the N12 National Route.</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p> <p>The length of the access road will be approximately 1km.</p>
Proximity to grid connection	Approximately 7-10km
Height of fencing	Approximately 1m – 1.5m high. Up to 2m in height.
Type of fencing	No new fencing is envisaged at this stage. Current fencing is a standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height. Standard security fencing to be considered.

SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

KRAALTJIES WIND ENERGY FACILITY (WEF)

FINAL ENVIRONMENTAL IMPACT REPORT

EXECUTIVE SUMMARY

INTRODUCTION AND PROJECT BACKGROUND

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream') is proposing the Kraaltjies Wind Energy Facility (WEF) and associated infrastructure near the town of Beaufort West in the Beaufort West Local Municipality, which falls within the Central Karoo District Municipality (**DFFE Reference Number: 14/12/16/3/3/2/2264**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 240 megawatts (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the EIA process for the proposed construction of the Kraaltjies WEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the National Department of Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning - WC DEADP) as well as CapeNature will also be consulted. The Environmental Impact Assessment (EIA) for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (NEMA). In terms of these regulations, a full EIA process is required for the proposed development. All relevant legislation and guidelines will be consulted during the EIA process and will be complied with at all times.

A 132kV overhead power line and Eskom portion of the on-site substation (namely the associated grid connection infrastructure) is also being proposed to feed the electricity generated by the proposed Kraaltjies WEF into the national grid. The project, which will form part of a separate EA application, is as follows:

- Kraaltjies Grid connection – WC DEA&DP Ref: Number: To be Allocated (part of separate BA process / application). Western Cape Department of Environmental Affairs and Development Planning (DEADP) will be the competent authority.

The proposed grid connection infrastructure will require a separate EA and will be subject to a separate Basic Assessment (BA) process to allow for future potential handover to Eskom. The proposed grid

connection infrastructure will include an Eskom portion of the on-site substation and a 132kV powerline (including associated infrastructure) to facilitate the connection. Following construction, the grid connection infrastructure will be owned and managed by Eskom. The current applicant will remain in control of the 11kV - 33/132kV IPP portion of the on-site substation which forms part of this EIA application.

APPLICABILITY OF NEMA EIA REGULATIONS, 2014 (AS AMENDED)

The following activities are applied for:

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 1		
11 (i)	GN R. 327 (as amended) Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	One (1) new 11kV - 33/132kV on-site substation consisting of two (2) portions: IPP portion / yard (11-33kV portion of the shared 11-33kV/132kV portion) (2ha) and an Eskom portion (2ha) (132kV portion of the shared 11-33kV/132kV portion which will be prepared and assessed under separate BA) including associated equipment and infrastructure, occupying a total area of approximately 4ha within the greater 25ha substation assessment area.
12 (ii) (a) (c)	GN R. 327 (as amended) Item 12: The development of: ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Drainage lines and watercourses are scattered across the proposed site. Roads, underground cables and/or powerlines will cross these watercourses or drainage lines or be within 32m thereof. The proposed developments will therefore entail the construction of infrastructure with physical footprints of approximately 100m ² or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse.
14	GN R. 327 (as amended) Item 14: The development and related operation of facilities or infrastructure, for the storage, or	The proposed development will include the construction of an on-site

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m ³ or more but not exceeding 500m ³ .	<p>BESS using Lithium-ion technology. The BESS will be up to 4ha in extent.</p> <p>It should be noted that no stand-alone facilities for the storage of dangerous goods external to the BESS will be constructed as part of the proposed development.</p>
19	GN R. 327 (as amended) Item 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	<p>The proposed development involves the construction of a WEF as well as other associated infrastructure (including the IPP portion/ yard of the 11-33kV/132kV shared on-site substation, up to 11-33kV overhead and / or underground cabling, roads and BESS) within the proposed project site.</p> <p>Although the development footprint of the site area has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal infrastructure to be constructed will need to traverse surface water features / watercourses. In addition, during construction, soil will need to be removed from surface water features / watercourses for construction purposes where unavoidable.</p>
24 (ii)	<p>GN R. 327 (as amended) Item 24: The development of a road -</p> <p>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>Internal roads are required within the project site to provide access to each wind turbine, the shared 11-33kV/132kV on-site substation, as well as to facilitate access throughout the WEF.</p> <p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		<p>in transformers etc), after construction they will be rehabilitated back down to 8m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route;</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Internal roads will have a final servitude of 8m during operation. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p>
28 (ii)	<p>GN R. 327 (as amended) Item 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</p>	The total area to be developed for the proposed renewable energy facilities is greater than 1ha and occurs outside an urban area in an area currently zoned as agricultural land.
56 (ii)	<p>GN R. 327 Item 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p>	Existing roads may require widening by more than 6m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities associated with the WEF and associated infrastructure.
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended		

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
1	GN R. 325 (as amended) Item 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,	The proposed development will entail the construction of a WEF where the respective electricity output will be up to approximately 240MW. In addition, the proposed WEF developments will be located outside urban areas.
15	GN R. 325 (as amended) Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed 11-33/132kV shared on-site substation, O&M building, BESS, construction laydown area, guard house, internal access roads, underground cabling and other associated infrastructure.
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended		
3 (i)	GN R. 324 (as amended) Item 3: The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower— (b) will exceed 15 metres in height— i. Western Cape i. All areas outside urban areas.	The development of the WEF facility and associated infrastructure will consist of a mast tower used for telecommunication broadcasting and will exceed 15 metres in height. The mast will be located outside urban areas.
4 i. (ii) (aa)	GN R. 324 (as amended) Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	The development of the WEF facilities and associated infrastructure is likely to require the development of roads wider than 4m with a reserve of less than 13.5m within areas classified as CBA. These roads will occur within the Western Cape Province, outside urban areas. The provincial CBA spatial data for the Western Cape indicates that majority of the project site falls within the Ecological Support

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		Areas and a small portion of the site overlaps with areas classified as Critical Biodiversity Areas.
10(i)(ii)	<p>GN R. 324 (as amended) Item 10: The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres</p> <p>i. Western Cape ii. All areas outside urban areas</p>	The proposed WEF and associated infrastructure will include the storage and handling of goods such as transformer oils and lubricants (considered dangerous) between 30 to 80 cubic metres in the substation area that will need to be authorised outside an urban area
12(i)(ii)	<p>GN R. 324 (as amended) Item 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.</p> <p>i. Western Cape ii. Within critical biodiversity areas identified in bioregional plans</p>	<p>The proposed WEF development will involve the clearance of more than 300m² or more for the proposed on-site substation, O&M Building BESS, construction laydown area internal roads, underground cabling, guard house and other associated infrastructure.</p> <p>The provincial CBA spatial data for the Western Cape indicates that majority of the project site falls within the Ecological Support Areas and a small portion of the site overlaps with areas classified as Critical Biodiversity Areas.</p>
14(ii)(a)(c)(i)(ii)(ff)	<p>GN R. 324 (as amended) Item 14: The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse; (b) in front of a development setback; or</p>	<p>The proposed development will entail the development of infrastructure with physical footprints of 10m² or more within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature.</p> <p>Although the layouts of the respective proposed developments will be designed to avoid the identified surface water features / watercourse as far as possible, some of the</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>i. Western Cape</p> <p>i. Outside urban areas:</p> <p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>infrastructure / structures will likely need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (Substation, BESS, O&M building, construction laydown area, guard house, underground MV cabling / powerlines and roads) for the development will occur within Critical Biodiversity Areas (CBAs) located outside of urban areas.</p>
18 i. ii. (aa)	<p>GN R. 324 (as amended) Item 18: The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p>i. Western Cape</p> <p>ii. All areas outside urban areas:</p> <p>(aa) Areas containing indigenous vegetation</p>	<p>Access and internal roads requiring widening of more than 4 meters and / or lengthening of more than 1 kilometer will be required to access the wind turbines as well as the associated infrastructure for areas outside the Western Cape within areas containing indigenous vegetation.</p> <p>Existing roads will be used wherever possible.</p>

DETAILS OF ALTERNATIVES CONSIDERED

No location alternatives are being considered for the Kraaltjies WEF as these sites were selected prior to the commencement of the EIA Process.

The layout that was prepared for the Kraaltjies WEF has been assessed by specialists to identify potential impacts that may arise from the development. Based on the findings of the specialists, the potential impacts identified and the outcomes of the public participation process of the Scoping Phase, the layout has been designed to avoid environmental no-go areas.

This final layout put forward for authorisation has been further assessed by all specialists (refer to Impact Tables and findings and recommendations) and has integrated recommendations into the layout to be

approved. No further layout alternatives have been considered as part of the EIA process. Impact assessments have been undertaken on the final layout.

No technology alternatives will be considered. The choice of turbine to be used will ultimately be determined by technological and economic factors at a later stage.

The option of not implementing the activity, or the “no-go” alternative, has been considered in the EIA process. Based on the specialist assessment, the following was noted:

The no-go alternative will result in the current status quo being maintained as far as the avifauna, bats and the aquatic systems are concerned. The low human population in the area is definitely advantageous to sensitive avifauna, especially Red Data species. The no-go option would therefore eliminate any additional impact on the ecological integrity of the proposed development site.

With regard to heritage resources, even without development, fossils will still be destroyed by natural weathering and erosion. In the case of the No-Go Alternative the possible loss of local heritage resources through construction activities would be avoided, however potential improvements in palaeontological understanding through professional mitigation - i.e. recording and collection of palaeontological material and data would be lost. The slow destruction of fossils exposed at the surface through natural weathering and erosion would continue, but at the same time new fossils are revealed for scientific study. On balance, it is concluded that no-go alternative would have a neutral impact on palaeontological heritage.

From a noise perspective, existing residual noise levels will remain as is within the project focus area. The specialist noted that it is difficult to assess how the no-go option will impact on the soundscape, as different people will value the existing residual noise levels differently. A person that retired to the area (within 2,000 m from the closest wind turbine) will set a high value to the existing residual noise levels, while the landowner that may financially benefit from the project will have a much lower appreciation of existing residual noise levels. Based on the specialist's opinion, the no-go option will result in a positive benefit of low significance.

From an agricultural perspective the no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential impact is that due to continued low rainfall in the area, which is likely to be exacerbated by climate change, agriculture in the area will come under increased pressure in terms of economic viability. The development offers an additional income source to agriculture, without excluding agriculture from the land. Therefore, the negative agricultural impact of the no-go alternative is more significant than that of the development, and so, purely from an agricultural impact perspective, the proposed development is the preferred alternative.

From an avifaunal perspective, the no-go alternative will result in the current status quo being maintained. The low human population in the area is definitely advantageous to sensitive avifauna, especially Red Data species. The no-go option would eliminate any additional impact on the ecological integrity of the proposed development site as far as avifauna is concerned.

From a bats perspective, if the development does not progress, the status quo is expected to prevail, and no negative impact is expected. The ideal concerning managing the impact of WEFs on bats throughout the project's lifespan is to maintain bat populations as they occur on site and avoid attracting more bats to the area of potential collision.

From a landscape perspective, the no-go alternative will result in the current status quo being maintained as far as the cultural landscape is concerned and it should continue to operate in the similar way maintaining the current significance. If the project is not developed, infrastructure will not be built to the west of the N12 and the aesthetic and visual impact of new RE developments will be contained to the eastern viewshed.

From an aquatic perspective, Should the project not proceed, then current status quo with regard the aquatic environment would remain unchanged. Overall, these catchment and subsequent rivers / watercourses are largely in a natural state. Present day impacts do occur in localised areas and included the following:

- Erosion as a result of road crossings;
- Several farm dams; and
- Undersized culverts within present day road crossings, although very few occur on site.

The no-go option would also mean that the social environment is not affected as the status quo remains. On a negative basis, it also means that all the positive aspects associated with the project would not materialise. Consequently, there would be no job creation, no revenue streams into the local economy and municipal coffers, and a lost opportunity to enhance the National Grid with a renewable source of energy. Considering that Eskom's coal-fired power stations are a huge contributor to carbon emissions, the loss of a chance to supplement the National Grid through renewable energy would be significant at a national, if not at a global level.

The area would also retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

The no- go alternative is not currently the preferred alternative by the Applicant. No fatal flaws have been identified by the specialists and all have indicated that project should proceed with the proposed mitigation measures taken into account.

POSITIVE AND NEGATIVE IMPACTS IDENTIFIED FOR THE PROPOSED DEVELOPMENT

Impact	Pre-mitigation	Post-mitigation
PLANNING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
None Identified		
Terrestrial Ecology		
None Identified		

Impact	Pre-mitigation	Post-mitigation
Agricultural		
None Identified		
Avifauna		
None Identified		
Bat		
Placing turbine positions in sensitive bat habitat	MEDIUM	LOW
Heritage		
Archaeology		
The graves and burial grounds are located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	MEDIUM	LOW
One historical homestead is located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	MEDIUM	LOW
Four structures are located less than 100m away from existing farm roads within the proposed development area. The expansion of existing farm roads may impact the sites	MEDIUM	LOW
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	MEDIUM	LOW
Palaeontology		
None Identified		
Cultural Landscape		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	HIGH	LOW
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	VERY HIGH	MEDIUM
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape	VERY HIGH	LOW
Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	VERY HIGH	LOW
Noise		
Light delivery vehicles moving around onsite for surveying	LOW	LOW
Transport		
None Identified		
Visual		
None Identified		
Geotech		
None Identified		
Wake Effect		
None Identified		
Social		
Demographic change impacts		
Increased spread of disease	NEGATIVE	
Increased criminal activity	NEGATIVE	
Increased pressure on existing infrastructure and services	NEGATIVE	
Tension/competition between newcomers and local residents/communities	NEGATIVE	
Impacts arising from geographical or environmental changes		
Increased fire hazard	NEGATIVE	
Reduced safety in and around the project areas	NEGATIVE	
Site specific social sensitivities	NEGATIVE	
Impacts arising from economic change		

Impact	Pre-mitigation	Post-mitigation
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
Potential loss of revenue to tourism and ecotourism operations	NEGATIVE	
Unintended damages to private property	NEGATIVE	
CONSTRUCTION		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Loss of aquatic species of special concern	LOW	LOW
Damage or loss of riparian and alluvial systems in the construction phase	MEDIUM	LOW
Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	MEDIUM	LOW
Terrestrial Ecology		
Loss of species of special concern	LOW	LOW
Loss of terrestrial habitats – flora and vegetation	MEDIUM	LOW
Loss of terrestrial species - fauna	MEDIUM	LOW
Agricultural		
None identified		
Avifauna		
Displacement due to disturbance linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	MEDIUM	LOW
Displacement due to habitat transformation linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	LOW	LOW
Bat		
Clearing and excavation of natural habitat.	MEDIUM	LOW
Creating features which attract bats	MEDIUM	LOW
Construction activities	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	HIGH	LOW
Cultural Landscape		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	HIGH	LOW
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	HIGH	MEDIUM
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	VERY HIGH	LOW
Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	VERY HIGH	LOW
Noise		
Construction activities relating to the development of access roads (construction of new roads and upgrading of existing roads).	LOW	LOW
Construction traffic using access roads in vicinity of NSR.	LOW	LOW
Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	MEDIUM	LOW
Construction activities relating to civil works as well as erection of wind turbines	MEDIUM	LOW
Transport		

Impact	Pre-mitigation	Post-mitigation
Increase in Traffic	MEDIUM	LOW
Increase of Incidents with pedestrians and livestock	MEDIUM	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none">Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	LOW	LOW
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	LOW	LOW
Increased erosion due to vegetation clearing, alteration of natural drainage	LOW	LOW
Wake Effect		
None identified		
Social		
Demographic change impacts		
Increased spread of disease	NEGATIVE	
Increased criminal activity	NEGATIVE	
Increased pressure on existing infrastructure and services	NEGATIVE	
Tension/competition between newcomers and local residents/communities	NEGATIVE	
Impacts arising from geographical or environmental changes		
Increased fire hazard	NEGATIVE	
Reduced safety in and around the project areas	NEGATIVE	
Site specific social sensitivities	NEGATIVE	
Impacts arising from economic change		
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
Potential loss of revenue to tourism and ecotourism operations	NEGATIVE	
Unintended damages to private property	NEGATIVE	
OPERATIONAL		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase	MEDIUM	LOW
Terrestrial Ecology		
Loss of terrestrial species - fauna		
Agricultural		
None Identified		

Impact	Pre-mitigation	Post-mitigation
Avifauna		
Mortality of priority species due to collisions with the wind turbines.	MEDIUM	LOW
Mortality of priority species due to electrocutions on the overhead sections of the internal 11-33kV cables	MEDIUM	LOW
Mortality due to collisions with the overhead sections of the internal 11-33kV cables.	MEDIUM	LOW
Bat		
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying (high risk) species have predominantly been confirmed at the proposed Kraaltjies WEF site.	HIGH	MEDIUM
Bat fatality during migration. Limited activity by <i>Miniopterus natalensis</i> , a Near Threatened migration species, had been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	HIGH	MEDIUM
Bat fatality of bat species of conservation value. Calls similar to the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	HIGH	MEDIUM
Bat mortality due to the attraction of bats to wind turbines. Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	LOW	LOW
Loss of habitat and foraging space during operation of the wind turbines.	HIGH	MEDIUM
Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	MEDIUM	MEDIUM
Wake Effect		
Wake impact on planned neighbouring wind farms	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
None Identified		
Cultural Landscape		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	HIGH	LOW
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	HIGH	MEDIUM
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	VERY HIGH	MEDIUM
Noise		
Noises from operating wind turbines	MEDIUM	LOW
Noises from operating wind turbines	HIGH	LOW
Transport		
Increase in Traffic	LOW	LOW
Increase of Incidents with pedestrians and livestock	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
New / Larger Access points	LOW	LOW

Impact	Pre-mitigation	Post-mitigation
Visual		
<ul style="list-style-type: none">The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF.Shadow flicker impacts may affect residents within 800m of a turbine placement.	MEDIUM	MEDIUM
Geotech		
Increased erosion due to alteration of natural drainage	LOW	LOW
Wake Effect		
Wake impact on planned neighbouring wind farms	LOW	LOW
Social		
Impacts arising from economic change		
Increased socio-economic development associated with more available electricity	POSITIVE	
Reduced property values	NEGATIVE	
Unintended damages to private property	NEGATIVE	
Impacts arising from geographical or environmental changes		
Site specific social sensitivities	NEGATIVE	
DECOMMISSIONING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Loss of aquatic species of special concern	LOW	LOW
Damage or loss of riparian and alluvial systems in the construction phase	MEDIUM	LOW
Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	MEDIUM	LOW
Terrestrial Ecology		
Loss of species of special concern	LOW	LOW
Loss of terrestrial habitats – flora and vegetation	MEDIUM	LOW
Loss of terrestrial species - fauna	MEDIUM	LOW
Agricultural		
None Identified		
Avifauna		
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	LOW	LOW
Bat		
Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
None Identified		
Cultural Landscape		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	HIGH	LOW

Impact	Pre-mitigation	Post-mitigation
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	HIGH	MEDIUM
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	VERY HIGH	LOW
Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	VERY HIGH	LOW
Noise		
Demolishing of the wind turbine structures, removal of concrete structures (including foundations), powerlines, substations, rehabilitation of disturbed areas.	LOW	LOW
Transport		
Increase in Traffic	LOW	LOW
Increase of Incidents with pedestrians and livestock	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none">Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.Decommissioning activities may be perceived as an unwelcome visual intrusion.Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment.Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	LOW	LOW
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	LOW	LOW
Increased erosion due to vegetation clearing, alteration of natural drainage	LOW	LOW
Wake Effect		
None Identified		
Social		
Demographic change impacts		
Increased criminal activity	NEGATIVE	
Increased fire hazard	NEGATIVE	
Improved visual landscape	POSITIVE	
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
CUMULATIVE		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	LOW	LOW
Terrestrial Ecology		

Impact	Pre-mitigation	Post-mitigation
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	LOW	LOW
Agricultural		
None Identified		
Avifauna		
<ul style="list-style-type: none"> Mortality due to collisions with the wind turbines Displacement due to disturbance during construction and operation of the wind farm Displacement due to habitat change and loss at the wind farm Mortality due to electrocution on the electrical infrastructure 	MEDIUM	LOW
Bat		
Cumulative effect of destruction of active roost of several WEFs as well as features that could serve as potential roosts.	MEDIUM	MEDIUM
Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	HIGH	HIGH
Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several WEFs	HIGH	MEDIUM
Several WEFs stretching over thousands of hectares.	HIGH	MEDIUM
Several wind farms with associated bat mortality reducing the size, genetic diversity, resilience, and persistence of bat populations over the lifespan of WEFs.	HIGH	MEDIUM
Heritage		
Archaeology		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	MEDIUM	LOW
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	MEDIUM	LOW
Cultural Landscape		
Inappropriate cumulative development degrades the significant ecological elements of the cultural landscape	VERY HIGH	MEDIUM
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM
Inappropriate cumulative development degrades the significant socio-economic opportunities of the cultural landscape	VERY HIGH	MEDIUM
Noise		
Cumulative noises due to operating wind turbines from other wind energy facilities in the area	HIGH	LOW
Transport		
Increase in Traffic	MEDIUM	MEDIUM
Increase of Incidents with pedestrians and livestock	MEDIUM	MEDIUM
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	MEDIUM	LOW
Increase in Dust from gravel roads	MEDIUM	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none"> Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. 	MEDIUM	MEDIUM

Impact	Pre-mitigation	Post-mitigation
<ul style="list-style-type: none"> Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area. 		
Geotech		
None identified		
Wake Effect		
None identified		
Social		
None identified		
No-Go		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Should the project not proceed, then the current status quo with regards to the environment would remain unchanged. Overall, the area is largely in a natural state. But present-day impacts do occur in localised areas.	LOW	LOW
Terrestrial Ecology		
Should the project not proceed, then the current status quo with regards to the environment would remain unchanged. Overall, the area is largely in a natural state. But present-day impacts do occur in localised areas.	LOW	LOW
Agricultural		
None Identified		
Avifauna		
None Identified		
Bats		
None Identified		
Heritage		
Archaeology		
None Identified		
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to natural weathering and erosion farming activities and possible illegal fossils collection	MEDIUM	N/A
Cultural Landscape		
None Identified		
Noise		
Ambient sound levels to remain unaffected		
Transport		
None Identified		
Visual		
None Identified		
Geotech		
None Identified		
Social		
None Identified		

PUBLIC PARTICIPATION PROCESS

The following was undertaken during the EIA Phase (as per the approved Final Scoping and Plan of Study):

- The I&AP database was updated as and when necessary during the execution of the EIA.
- The DEIAR underwent a 30-day comment and review period that ran from 06th September 2023 until 09th October 2023.
- All parties on the IA&P database were notified via email or sms of the opportunity to review the Draft EIA Report, the review period and the process for submitting comments on the report (proof included in Appendix 5).
- The availability of the draft report for review and comment was advertised in Die Courier newspaper on 01 September 2023.
- Reminder notifications of the closing DEIR comment period were sent out on the 21 September 2023, 28 September 2023, 04 October 2023 and 09 October 2023 to ensure that comments and/or concerns were received from the OoS and /or registered I&APs.
- All comments received from I&APs and the responses thereto have been included in the final EIA Report submitted to DFFE.
- A copy of the Draft EIA Report was made available at the Beaufort West Library, 15 Church Street, Beaufort West and Prince Albert Public Library, Church Street, Prince Albert, Western Cape, South Africa
- A Comments and Response Report has been updated and included in the Final EIA Report, which records the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The Final EIA report with all comments included has been submitted to DFFE for review and approval.
- All I&APs will be notified via email, sms or fax after having received written notice from DFFE on the final decision on the application. These notifications will include the process required to lodge an appeal, as well as the prescribed timeframes in which documentation should be submitted.
- As part of the CLA recommendations, additional engagement with the farm workers was undertaken as part of the PPP and included in the final report.

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

KRAALTJIES WIND ENERGY FACILITY (WEF)

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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SOUTH AFRICA MAINSTREAM RENEWABLE POWER DEVELOPMENTS (PTY) LTD

KRAALTJIES WIND ENERGY FACILITY (WEF)

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as 'Mainstream') is proposing the Kraaltjies Wind Energy Facility (WEF) and associated infrastructure near the town of Beaufort West in the Beaufort West Local Municipality, which falls within the Central Karoo District Municipality (**Figure 1**) (DFFE Reference Number: **14/12/16/3/3/2/2264**). The overall objective of the proposed development is to generate electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The proposed development will have a maximum total generation capacity of up to 240 megawatts (MW).

SiVEST Environmental Division has subsequently been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the EIA process for the proposed construction of the Kraaltjies WEF and associated infrastructure. The proposed development requires an Environmental Authorisation (EA) from the National Department of Forestry, Fisheries and the Environment (DFFE). However, the provincial authority (i.e. the Western Cape Department of Environmental Affairs and Development Planning – WC DEADP) as well as CapeNature will also be consulted. The Environmental Impact Assessment (EIA) for the proposed development will be conducted in terms of the EIA Regulations, 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (NEMA). In terms of these regulations, a full EIA process is required for the proposed development. All relevant legislation and guidelines will be consulted during the EIA process and will be complied with at all times.

A 132kV overhead power line and Eskom portion of the on-site substation (namely the associated grid connection infrastructure) is also being proposed to feed the electricity generated by the proposed Kraaltjies WEF into the national grid. The project, which will form a part of separate EA application, is as follows:

- Kraaltjies Grid connection – **WC DEA&DP Ref:** To be Allocated (part of separate BA process / application). Western Cape Department of Environmental Affairs and Development Planning (DEADP) will be the competent authority.

The proposed grid connection infrastructure will require a separate EA and will be subject to a separate Basic Assessment (BA) process to allow for future potential handover to Eskom. The proposed grid connection infrastructure will include an Eskom portion of the on-site substation and a 132kV powerline (including associated infrastructure) to facilitate the connection. Following construction, the grid connection

infrastructure will be owned and managed by Eskom. The current applicant will remain in control of the 11kV – 33/132kV portion of the on-site substation which forms part of this EIA application.

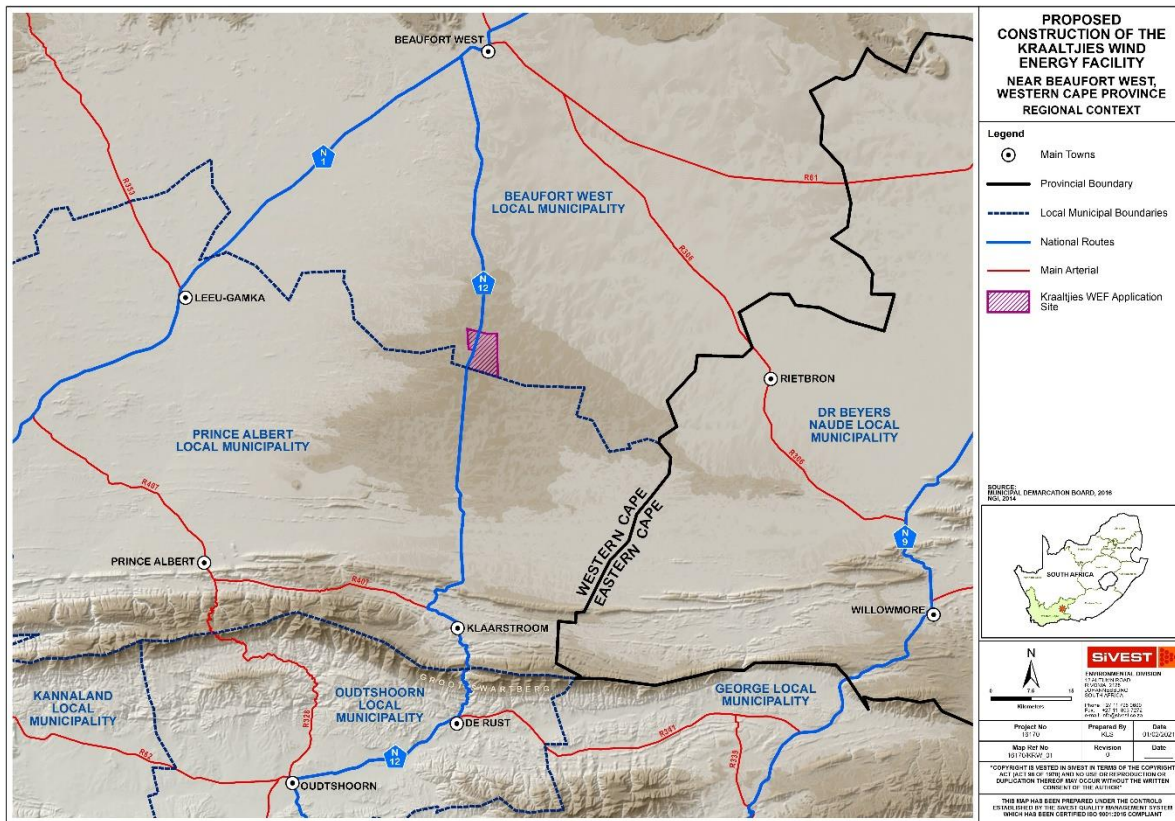


Figure 1: Kraaltjies Regional Context

1.1 Overview of the EIA Process

The National Environment Management Act, 1998 (Act No 107 of 1998) (NEMA) promotes the use of scoping and EIA in order to ensure integrated environmental management. The purpose of an EIA is to provide the Authority with sufficient information to make an informed decision on whether an activity should proceed or not, and to assist with selecting an option that will provide the most benefit and cause the least impact. The EIA process should identify activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement.

This project requires an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998, as amended) and the 2014 EIA Regulations (as amended). The process triggered is a Scoping and Environmental Impact Assessment report (S&EIR). All the phases including the Environmental Management Programme report (EMPr) must be prepared in terms of the

NEMA and GN R. 982, (as amended by GN R. 326) and the associated activities listed under GN R. 983, GN R. 984 and GN R. 985 (as amended by GN R 327, GN R 325, and GN R 324 respectively).

Objectives and Overview of the Environmental Impact Assessment (EIA) Phase

The EIA Phase is a comprehensive study that addresses all the issues raised in the Scoping Phase as well as provides further assessment of the sensitivities identified by the various specialist as well as the proposed impacts of the proposed development. The main objectives of the EIA phase are to assess the significance of the impacts that may occur from the proposed development, provide mitigation measures and management recommendations to reduce the significant impacts, compile an Environmental Management Programme for use during construction to ensure correct monitoring procedures are followed as well as to undertake further PPP.

The EAP therefore compiled a Draft Environmental Impact Assessment Report (DEIAR) and a draft Environmental Management Programme (EMPr) which was made available for public and stakeholder comment for a period of 30 days as part of the public participation process. All comments received in response to the DEIAR have been considered and responded to, incorporated into the Final EIA Phase and submitted to the Department for decision.

Public Participation Process

Public and Stakeholder participation is a fundamental component of the EIA Process. The inclusion of the views of the affected and interested public aids in ensuring the EIA Process is open, transparent and robust, as well as that the decision-making process is equitable and fair. This in turn guides informed choice and better environmental outcomes. It further presents a valuable source of information on key impacts, potential mitigation measures and the identification and selection of feasible alternatives. This process allows the EAP to engage further with identified key stakeholders and Interested and Affected Parties (I&APs). The Draft EIA Report has been made available to all I&APs as well as Organs of State (OoS) for a period of 30 days from the **06th of September 2023 until the 09th of October 2023**, following this, all comments have been included in the Comments and Response Report which is submitted as part of the FEIAR to the Department for decision.

1.2 Content Requirements for an Environmental Impact Assessment Report

An Environmental Impact Assessment Report must contain the information that is necessary for the competent authority to consider and come to a decision on the application. The content requirements for an Environmental Impact Assessment Report (as provided in Appendix 3 of the EIA Regulations 2014, as amended), as well as details of which section of the report fulfils these requirements, are shown in **Table 1** below.

Table 1: Content requirements for an Environmental Impact Assessment Report

Content Requirements	Applicable Section
(a) details of- (i) the EAP who prepared the report; and	4

Content Requirements	Applicable Section
(ii) the expertise of the EAP, including a curriculum vitae;	
(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; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	5
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	6.2
(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	6.2
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	10
(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 development footprint within the approved site as contemplated in the accepted scoping report;	12
(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report;	12
(h) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including - (i) details of all the alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified 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; (vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected	13

Content Requirements	Applicable Section
<p>focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) the possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) the outcome of the site selection matrix;</p> <p>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and</p> <p>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>	
<p>(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including—</p> <p>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(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;</p>	14.3
<p>(i) an undertaking under oath or affirmation by the EAP in relation to-</p> <p>(i) the correctness of the information provided in the report;</p> <p>(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and</p> <p>(iii) 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;</p>	Appendix 1
<p>(j) an assessment of each identified potentially significant impact and risk, including—</p> <p>(i) cumulative impacts;</p> <p>(ii) the nature, significance and consequences of the impact and risk;</p> <p>(iii) the extent and duration of the impact and risk;</p> <p>(iv) the probability of the impact and risk occurring;</p> <p>(v) the degree to which the impact and risk can be reversed;</p> <p>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) the degree to which the impact and risk can be mitigated;</p>	14.3
<p>(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;</p>	16
<p>(l) an environmental impact statement which contains—</p> <p>(i) a summary of the key findings of the environmental impact assessment;</p> <p>(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 development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</p>	17

Content Requirements	Applicable Section
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	18
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	19
(o) 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;	20
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	21
(q) 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;	22
(r) 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;	22
(s) an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Appendix 1
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	n/a
(u) an indication of any deviation from the approved scoping report, including the plan of study, including— (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	24
(v) any specific information required by the competent authority; and	25
(w) any other matter required in terms of section 24(4)(a) and (b) of the Act.	All requirements have been met in this report.
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.	All requirements have been met in this report.

2. PROJECT TITLE

Proposed Development of the Kraaltjies up to 240MW Wind Energy Facility (WEF) and Associated Infrastructure near Beaufort West in the Western Cape Province.

3. DETAILS OF APPLICANT

3.1 Name and contact details of the Applicant

Name and contact details of Applicant:

Table 2: Name and contact details of the applicant

Business Name of Applicant	South Africa Mainstream Renewable Power Developments (Pty) Ltd
Physical Address	4th Floor Mariendahl House, Newlands on Main, Cnr Main Road and Campground, Claremont, Cape Town
Postal Address	PO Box 45063, CLAREMONT, Cape Town
Postal Code	7735
Telephone	021 657 4045
Email	eugene.marais@mainstreammrp.com / sa-devapplications@mainstreammrp.com

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

4.1 Name and contact details of the Environmental Consultant

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

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

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

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

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

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

Name of representative of the EAP	Educational Qualifications	Professional Affiliations	Experience (years)
Michelle Nevette	MEnvMgt. (Environmental Management)	SACNASP ¹ Registration No. 120356 EAPASA ² Registration No. 2019/1560 IAIAsa ³	22
Natalie Pullen	MSc (Environmental Biotechnology)	EAPASA Registration No. 2018/132 IAIAsa	19
Rendani Rasivhetshele	BSc Hons Environmental Management	EAPASA Registration No. 2019/1729	7
Phumela Madubela	BSc (Hons) Environmental Monitoring & Modelling	Cand.Sci.Nat Registration No. 137670 IAIA	7

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

4.3 Names and expertise of the specialists

The table below provides the names of the specialists involved in the project:

Table 5: Names of specialists involved in the project

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Gage Consulting (Pty) Ltd	Duan Swart	Desktop Geotechnical Assessment	Professional registered SACNASP, PrNatSci (137543), MSAIEG, Master of Science (Engineering Geology), *Doctoral Candidate (Engineering Geology)	4
ACER (Africa) Environmental Consultants	Lloyd McFarlane	Social Impact Assessment	MSc. Environmental Science (Sustainable development).	10

¹ South African Council for Natural and Scientific Professions

² Environmental Assessment Practitioners Association of South Africa

³ International Association for Impact Assessment South Africa

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Enviro Acoustic Research	Morné de Jager	Noise Impact Assessment	B. Ing (Chemical) SAAI, ASA	14
EnviroSci	Dr Brian Colloty	Surface Water Impact Assessment/ Biodiversity Impact Assessment	Ph D (Botany – Estuaries & Mangroves) Pr. Sci. Nat. 400268/07	25
Johann Lanz	Johann Lanz	Agriculture and Soils Impact Assessment (desktop)	M.Sc. (Environmental Geochemistry)	24
PGS Heritage (Pty) Ltd	Wouter Fourie	Heritage Impact Assessment	Professional Archaeologist (ASPA) Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP)	22
	John Almond	Palaeontological Impact Assessment	PhD (Palaeontology) Palaeontological Society of South Africa, Associated of Professional Heritage (W Cape)	40
	Nikki Mann	Archaeological Assessment	MSc Archaeology Professional Archaeologist with the Associated of Southern African Professional Archaeologists (ASAPA)	7
	Emmylou Bailey	Cultural Landscape Assessment	MA Archaeology and Heritage Management APHP, ASAPA	15

Company	Name of representative of the specialist	Specialist	Educational Qualifications	Experience (years)
Chris Van Rooyen Consulting	Chris van Rooyen	Avifaunal Impact Assessment	BA LLB	22
	Albert Froneman	Avifaunal Impact Assessment	MSc (Conservation)	22
Stephanie Dippenaar Consulting	Stephanie Dippenaar	Bat Impact Assessment	MEM (Environmental Management)	22

5. LOCATION OF THE ACTIVITY

5.1 21 Digit Surveyor General Codes and Farm names of the sites

Table 6: 21 Digit Surveyor General Code

SG CODE	DESCRIPTION
C0090000000037400010	Portion 10 of the Farm Brits Eigendom No. 374
C0090000000037400025	Portion 25 of the Farm Brits Eigendom No. 374

5.2 Coordinates of the site

COORDINATES POINTS FOR THE PROPOSED DEVELOPMENT SITE

KRAALTJIES WEF: APPLICATION SITE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°50'6.715"S	22°32'52.091"E
2	32°50'32.942"S	22°36'23.824"E
3	32°54'53.931"S	22°36'35.339"E
4	32°53'58.918"S	22°32'54.01"E
5	32°52'13.371"S	22°33'40.706"E
6	32°52'6.335"S	22°33'4.245"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
8	32°52'28.724"S	22°34'53.63"E

COORDINATES POINTS FOR THE SUBSTATION AREA

KRAALTJIES WEF: PROPOSED SUBSTATION (PREFERRED)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°53'4.847"S	22°34'11.864"E
2	32°53'0.735"S	22°34'17.453"E
3	32°53'3.07"S	22°34'19.787"E
4	32°53'7.053"S	22°34'14.07"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°53'3.883"S	22°34'15.826"E

KRAALTJIES WEF: IPP SS (PREFERRED)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°53'2.32"S	22°34'9.315"E
2	32°52'58.251"S	22°34'15.012"E
3	32°53'0.543"S	22°34'17.26"E
4	32°53'4.633"S	22°34'11.607"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°53'1.485"S	22°34'13.234"E

COORDINATES POINTS FOR THE BESS AREA

KRAALTJIES WEF: PROPOSED BESS (PREFERRED)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°52'53.561"S	22°34'10.557"E
2	32°52'51.505"S	22°34'13.406"E
3	32°53'1.399"S	22°34'23.235"E
4	32°53'3.391"S	22°34'20.366"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°52'57.566"S	22°34'16.982"E

COORDINATES POINTS FOR THE CONSTRUCTION LAYDOWN AREA

KRAALTJIES WEF: PROPOSED CONSTRUCTION LAYDOWN AREA (PREFERRED)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST

1	32°52'57.159"S	22°34'0.835"E
2	32°52'53.668"S	22°34'5.803"E
3	32°52'57.887"S	22°34'9.936"E
4	32°53'1.399"S	22°34'4.947"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°52'57.352"S	22°34'5.504"E

COORDINATES POINTS FOR THE O&M BUILDING AREA

KRAALTJIES WEF: PROPOSED O&M BUILDING (PREFERRED)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°53'5.821"S	22°34'10.126"E
2	32°53'2.427"S	22°34'9.101"E
3	32°53'7.245"S	22°34'13.92"E
4	32°53'9.28"S	22°34'11.136"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°53'5.832"S	22°34'10.129"E

COORDINATES POINTS FOR THE GUARDHOUSE

KRAALTJIES WEF: GUARDHOUSE		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°52'57.295"S	22°33'29.97"E
2	32°52'56.746"S	22°33'31.617"E
3	32°52'58.073"S	22°33'32.303"E
4	32°52'58.713"S	22°33'30.656"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°52'57.615"S	22°33'31.205"E

COORDINATES POINTS FOR THE ALTERNATIVE INFRASTRUCTURE

KRAALTJIES WEF: PROPOSED SUBSTATION, BESS, CONSTRUCTION LAYDOWN AREA & O&M BUILDING AREA (ALTERNATIVE)		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
1	32°52'4.281"S	22°35'3.918"E
2	32°52'7.526"S	22°35'22.432"E

3	32°52'22.604"S	22°35'19.76"E
4	32°52'20.123"S	22°35'0.864"E
COORDINATES AT CENTRE POINT (DD MM SS.sss)		
POINT	SOUTH	EAST
5	32°52'14.015"S	22°35'11.171"E

COORDINATES POINTS FOR THE TURBINES

KRAALTJIES WEF: TURBINES		
COORDINATES AT CORNER POINTS (DD MM SS.sss)		
POINT	SOUTH	EAST
T1	32° 54' 15.476" S	22° 34' 54.278" E
T2	32° 53' 55.859" S	22° 34' 52.236" E
T3	32° 53' 25.713" S	22° 34' 4.365" E
T4	32° 53' 9.930" S	22° 33' 51.696" E
T5	32° 54' 3.522" S	22° 36' 11.196" E
T6	32° 53' 32.966" S	22° 35' 2.682" E
T7	32° 52' 39.631" S	22° 34' 17.983" E
T8	32° 53' 6.121" S	22° 34' 33.843" E
T9	32° 53' 36.071" S	22° 36' 19.976" E
T10	32° 52' 17.651" S	22° 34' 43.681" E
T11	32° 52' 49.916" S	22° 34' 54.643" E
T12	32° 53' 16.528" S	22° 35' 13.588" E
T13	32° 50' 55.242" S	22° 35' 32.573" E
T14	32° 52' 8.688" S	22° 35' 32.501" E
T15	32° 51' 12.750" S	22° 35' 19.230" E
T16	32° 53' 16.911" S	22° 35' 49.807" E
T17	32° 52' 57.985" S	22° 35' 52.122" E
T18	32° 50' 41.561" S	22° 36' 6.523" E
T19	32° 52' 41.586" S	22° 35' 57.330" E
T20	32° 51' 52.600" S	22° 35' 31.174" E

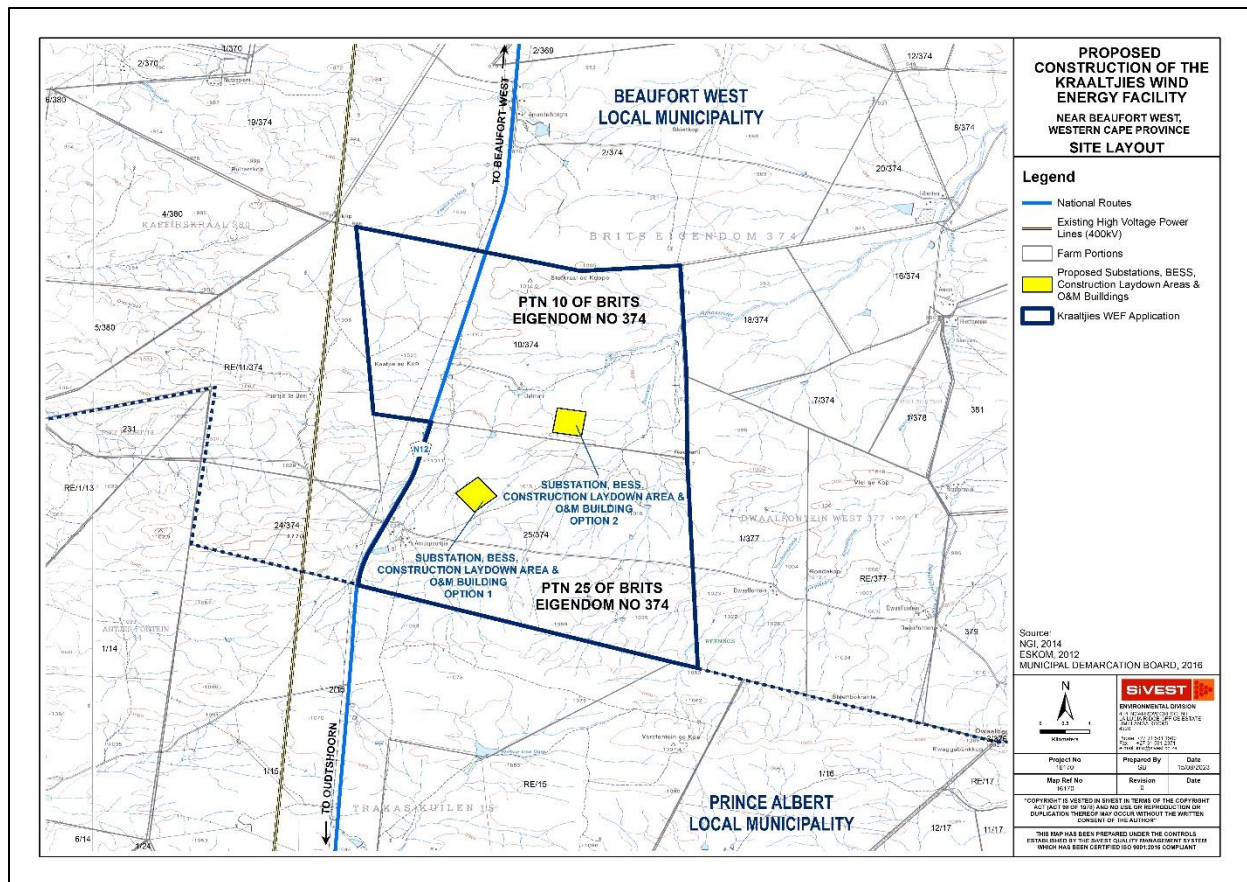


Figure 2: Site locality

6. ACTIVITY INFORMATION

6.1 WEF and Associated Infrastructure

It is anticipated that the proposed Kraaltjies WEF will comprise of up to twenty (20) wind turbines with a maximum total energy generation capacity of up to approximately 240MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process. In summary, the proposed Kraaltjies WEF will include the following components:

- Up to twenty (20) wind turbines with a maximum export capacity of approximately up to 240MW. This will be subject to allowable limits in terms of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).
- Each wind turbine will have a hub height of up to 120m to 200m and rotor diameter of up to approximately 200m.

- Permanent compacted hardstand areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m²) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development.
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth.
- Electrical transformers (690V/11-33kV) adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 11-33kV.
- Associated infrastructure of approximately 25ha which includes:
 - One (1) new 11-33kV/132kV IPP on-site substation including associated equipment and infrastructure. The proposed substation will be a step-up substation and will include an Eskom portion and an IPP portion, hence the substation has been included in the WEF EIA and in the grid infrastructure (substation and 132kV overhead power line) BA to allow for handover to Eskom. Following construction, the substation is expected to be owned and managed by Eskom.
 - A Battery Energy Storage System (BESS) will be located next to the onsite 11-33kV/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely comprise an array of containers, outdoor cabinets and/or storage tanks.
 - One (1) construction laydown / staging area of up to approximately 3ha. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town.
 - Operation and Maintenance (O&M) buildings, including offices, a guard house, operational control centre, O&M area / warehouse / workshop and ablution facilities to be located on the site identified for the substation.
- The wind turbines will be connected to the proposed substation via medium voltage (11-33kV) underground cabling and overhead power lines.
- Road servitude of 8m and a 20m underground cable or overhead line servitude.
- The main access road will be approximately 8 - 12 m wide. During construction the internal and access roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route. During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.
- A wind measuring lattice (approximately 140m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions.
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; Standard security fencing will be used
- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

Please refer to **Figure 3** below for the typical components of a wind turbine.

6.1.1 Main components of a Wind Energy Facility

It is anticipated that the proposed Wind Energy Facility will include wind turbines. Please refer to **Figure 3** below for the typical components of a wind turbine

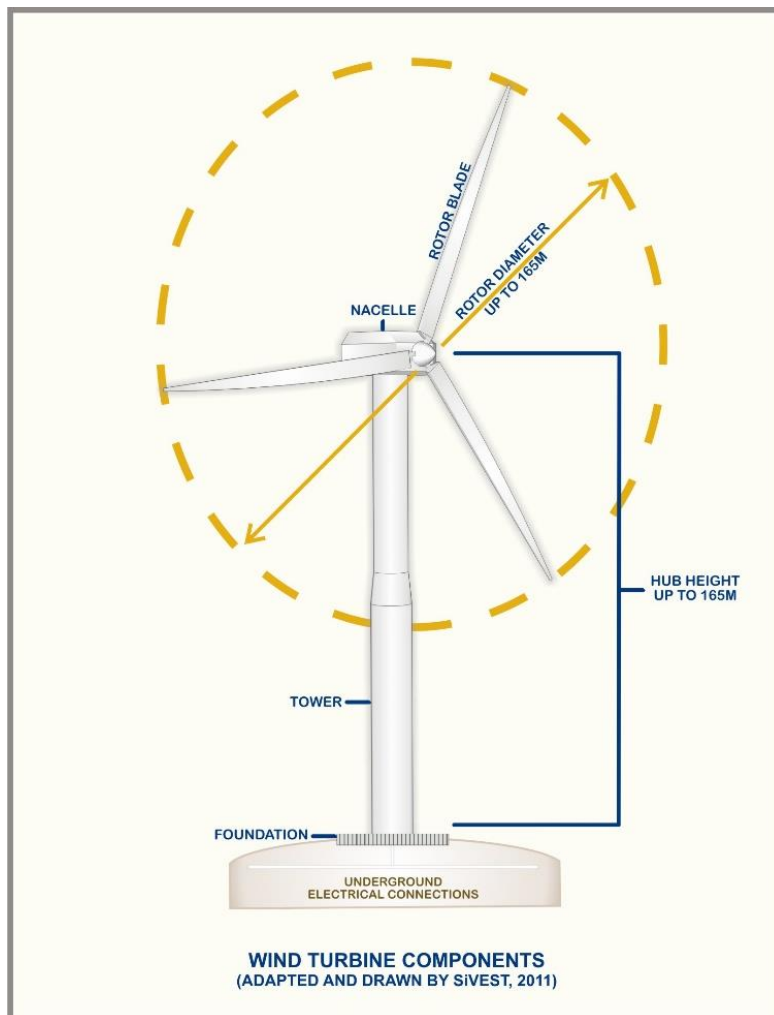


Figure 3: Example of the typical components of a Wind Turbine⁴

⁴ the specifications shown in the figure are for illustrative and example purposes only, these do not represent the dimensions that are being applied for environmental authorisation for this WEF.

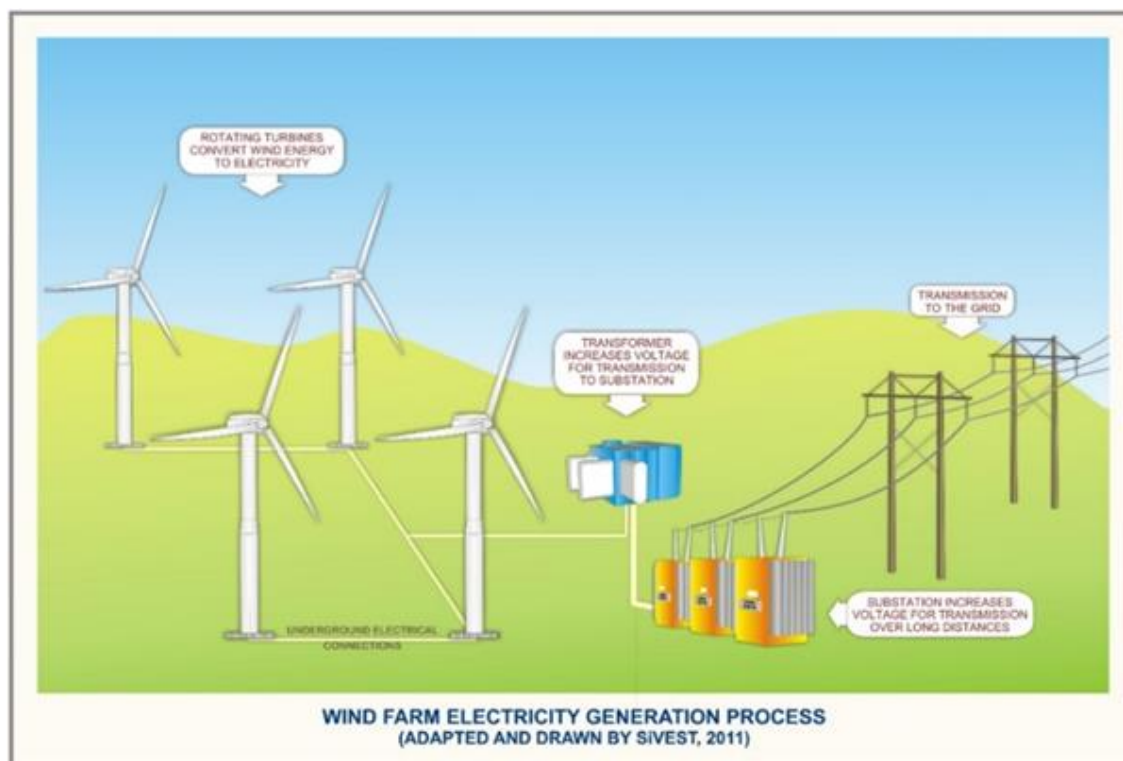


Figure 4: Conceptual WEF electricity generation process showing electrical connections

6.1.2 Battery Energy Storage System

A Battery Energy Storage System (BESS) is proposed to be included as part of the Kraaltjies WEF. The BESS will be located next to the onsite 11-33kV/132kV substation.

A (simple) battery is a device that is able to store electrical energy in the form of chemical energy and convert that energy into electricity. There are three main components of a battery: two terminals made of different chemicals (typically metals), the anode and the cathode; and the electrolyte, which separates these terminals. The electrolyte is a chemical medium that allows the flow of electrical charge between the cathode and anode. When a device (or, the electrical grid) is connected to a battery, chemical reactions occur on the electrodes that create a flow of electrical energy to the device (or the electrical grid).

During a discharge of electricity, the chemical on the anode releases electrons to the negative terminal and ions in the electrolyte through an oxidation reaction. At the positive terminal, the cathode accepts electrons, completing the circuit for the flow of electrons. The function of the electrolyte is to put the different chemicals of the anode and cathode into contact with one another in a way that the chemical potential can equilibrate from one terminal to the other, converting stored chemical energy into useful electrical energy (Bates, 2012).

A BESS may be constructed for the facility to store electricity produced when the wind blows for despatch during periods when the wind facility does not produce energy. A BESS thus makes energy supply from

the wind facility more efficient and reliable. The economic feasibility of a BESS will be determined during detailed design.

The BESS will have a footprint of up to 4 ha, mostly comprising an assemblage of numerous container-sized battery modules. It will be located adjacent or nearby to the on-site substation and/or office building. Micro-siting of the BESS within the assessed wind facility or substation will take place during detailed design and in accordance with the outcome of the site sensitivity assessment.

Solid state Lithium-ion batteries will be used. Solid state battery cells are integrated into battery modules, which are installed in standard racks similar to those used for telecommunication equipment (see figure below). Typically, the racks are then installed in a specially prepared shipping container to function as an integrated battery system.

Containers will be placed on raised concrete plinths and may be stacked on top of each other. Each container has a footprint of ~60 m² and is ~4 m high. Additional equipment, e.g. inverters and temperature control equipment, may be positioned between the battery containers. Sufficient spacing between each container must be ensured to adhere to safety requirements.



Figure 5: Solid state battery module (left) and system (right) Sources: Engadget.com

The chemical composition of the batteries (in the BESS) can be hazardous (typically comprised of a blend of one or more of the hazardous substances listed in SANS 10234), and the batteries will therefore be housed in intermodal containers (or similar) in a bunded area.

The Li-ion battery systems will arrive fully encased (and are thus not assembled on site) and have a number of design features that mitigate key risks of solid state batteries:

- Design features that mitigate the risk of fire or structural damage of batteries due to external temperature variations include the following:
 - Insulated containers;
 - Centrally monitored Heating, Ventilation and Air-Conditioning system;
 - Multiple sensors to measure temperature of battery cells and air;
 - Automated shut down mechanism if temperature gets too high;
 - Dousing and sealing mechanism for fire suppression and containment; and

- Battery management system to prevent overuse and maintain good battery condition; and
- Design features that mitigate the risk of fire due to volatility of the battery system and battery chemicals include the following:
 - Fire detection and suppressant system;
 - Gas level monitoring;
 - Heat sensors;
 - Battery condition monitoring;
 - Dousing mechanism for emergency cooling and fire suppression;
 - Density limits in containers; and
 - Spacing requirements between containers.

No specific specialist assessment will be required for Li-ion battery systems.

6.1.2.1 Risk Matrix associated with the BESS Technology

The BESS battery alternative technologies considered for the proposed BESS were as follows:

- Li-ion (lithium ion) Battery Technology

Each battery technology has potential risks associated with the battery technology type. The table below outlines the technology associated with each battery as well as the capability to mitigate the risk, based on practical and applicable technology solutions.

Table 7: Risks and Design Mitigation Measures associated with each Battery Technology.

Risk	Mitigation
Li-ion battery technology	
Temperature fluctuations Temperature fluctuations in the area mean that the batteries may be at risk of being damaged due to instability of temperatures. Resultant impacts could include fire, or permanent structural damage to the batteries.	The design of the Li-ion system includes: <ul style="list-style-type: none"> ▪ Insulated containers ▪ High powered HVAC (Heating, Ventilation and Air-Conditioning) System, monitored centrally ▪ Multiple temperature sensors for both the cells and air temperature ▪ Automated shut down mechanism if temperatures get too high ▪ Containers sealed and douse in case of fire to prevent the spread ▪ Battery management system to prevent overuse and maintain good battery condition
Fire and dangerous chemicals The volatility of the battery system, prior to any mitigation, could result in fire danger. In addition to this, there is a risk associated with the	The design of the Li-ion system includes: <ul style="list-style-type: none"> ▪ Fire detection and suppressant systems

Risk	Mitigation
chemicals contained within the actual battery storage system itself.	<ul style="list-style-type: none"> Gas level monitoring for several different gases (related to degradation of the batteries that increases risk of fire) Heat sensors Battery condition monitoring Dousing mechanism for emergency cooling and fire suppression Density limits in the containers Spacing limits between containers

The above-mentioned design mitigations will be considered in the design of the BESS should approval be issued for this application.

6.1.3 Technical Detail Summary

A summary of the project technical details is provided in **Table 8** below.

Table 8: Technical Detail Summary

Component	Description / Dimensions
Location of site (centre point)	32°52'47.24"S 22°34'48.12"E
Project site – Total extent of the affected property	3, 994.9ha
Total extent of the Development Footprint	40 ha
Number of Turbines	20 turbines
Turbine development area	Hard standing Area = 90m x 50m x up to 20 turbines
SG codes	C00900000000037400010 C00900000000037400025
Export capacity	Up to 240 megawatts
Proposed technology	Wind turbines and associated infrastructure
Hub height from ground	Up to 120m to 200m
Rotor diameter	Up to 200m
Substation and O&M building area and guard house	The on-site substation will include both the IPP portion (2 ha) and Eskom portion (2 ha) of the total substation area (4 ha) which is located within the greater 25 ha substation assessment area. The IPP portion will be included in the 11-33kV portion/yard of the on-site substation. The O&M building will be 2 ha in extent.
Construction laydown area	Approximately 3ha
Hard stand areas	Approximately 4 500m ²
Battery Energy Storage System (BESS)	A Battery Energy Storage System (BESS) will be located next to the onsite 11-33/132kV substation within the greater 25 ha

Component	Description / Dimensions
	substation assessment area. Lithium-ion technology will be used. The BESS will be up to 4 ha in extent. A Battery Energy Storage System (BESS) will be located next to the onsite 11-33/132kV substation. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks.
Width of internal access roads	<p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions.</p> <p>During operation, internal roads with a width of up to approximately 6m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p>
Length of internal access roads	Approximately 21km in length
Site Access / Internal Roads	<p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e., for bringing in transformers etc), after construction they will be rehabilitated back down to 8m – 12m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via a dirt road off the N12 National Route.</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p> <p>The length of the access road will be approximately 1km.</p>
Proximity to grid connection	Approximately 7-10km

Component	Description / Dimensions
Height of fencing	Approximately 1m – 1.5m high- Up to 2m in height.
Type of fencing	No new fencing is envisaged at this stage. Current fencing is a standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height. Standard security fencing to be considered.

6.1.4 Service Provisions: Water, Sewage and Waste requirements

The proposed project will require service provisions and infrastructure for the duration of the project such as water, sewage and waste. Mainstream will consult with the Prince Albert Local Municipality to confirm the supply of services (in terms of water, waste removal, sewage and electricity) for the proposed project prior to construction activities commencing. Where a registered disposal facility is not available close to the project area, the contractor shall provide a method statement for waste management. A copy of the Draft Environmental Impact Assessment Report (DEIAR) was sent to the municipality for comment during the 30-day public review period.

An outline of the services that will be required is discussed in detail below.

6.1.4.1 Water Usage

During the construction and operation phases of the proposed project, water will be obtained from either a registered service provider, existing boreholes within the project site or through surface water abstraction. The anticipated water usage will be for:

- Drinking;
- Ablution facilities;
- Access Road construction;
- Dust suppression
- Fire-fighting reserve
- Cleaning of facilities; and
- Construction of foundations for the Wind Turbines etc.

6.1.4.2 Sewage Usage

The project will require sewage services during the construction and operational phases. Low volumes of sewage or liquid effluent are estimated during both phases. Liquid effluent will be limited to the ablution facilities during the construction and operational phases. Portable sanitation facilities (i.e., chemical toilets) will be used during the construction and operational phases, which will be regularly serviced and emptied by a suitable (private) contractor on a weekly basis. It is anticipated that sewage will be disposed of in the municipal waterborne sewage system, if the municipality confirms capacity.

6.1.4.3 Solid Waste Generation

During the construction phase, the following waste materials are expected:

- Packaging material, such as the cardboard, plastic and wooden packaging and off-cuts;
- Hazardous waste from empty tins, oils, cement bags, soil containing oil and diesel (in the event of spills), and chemicals;
- Building rubble, discarded bricks, wood and concrete;
- Domestic waste generated by personnel; and
- Vegetation waste generated from the clearing of vegetation.

Solid waste will be managed via the Environmental Management Programme (EMPr) (**Appendix 9**), which incorporates waste management principles. General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed, emptied into trucks, and disposed at a registered waste disposal facility on a regular basis by an approved waste disposal Contractor (i.e. a suitable Contractor). Any hazardous waste (such as contaminated soil as a result of spillages) will be temporarily stockpiled (for less than 90 days) in a designated area on site (i.e., placed in leak-proof storage skips), and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

Waste disposal slips and waybills will be obtained for the collection and disposal of the general and hazardous waste. These disposal slips (i.e., safe disposal certificates) will be kept on file for auditing purposes as proof of disposal. The waste disposal facility selected will be suitable and able to receive the specified waste stream (i.e., hazardous waste will only be disposed of at a registered/licensed waste disposal facility). The details of the disposal facility will be finalised during the contracting process, prior to the commencement of construction. Where possible, recycling and re-use of material will be encouraged. Waste management is further discussed in the EMPr. During the operational phase of the proposed Kraaltjies WEF, waste generation will be minimal and will be disposed of at a licensed landfill site.

All solid waste generated (hazardous and non- hazardous) will be disposed of at a licensed landfill site by means of contracting a suitably registered waste handling company. This will be the responsibility of the Engineering Procurement Construction (EPC) Contractor during the construction phase of the proposed project and will have overall oversight to verify that the collection, transport, handling, and disposal of these wastes is being undertaken in a suitable manner. During the operational phase of the proposed Kraaltjies WEF, waste generation will be minimal and will be disposed of at a licensed landfill site.

6.1.4.4 Electricity Requirements

In terms of electricity supply for the construction phase, the developer will utilise a combination of generators and solar systems. Should a municipal connection be available, this will also be pursued. During the operational phase, the wind farm will not have any electricity requirements as the project itself will generate and distribute electricity.

6.2 NEMA Listed Activities

The amended EIA Regulations promulgated under Section 24(5) of the National Environmental Management Act, Act 107 of 1998 and published in Government Notice No. R. 326 list activities which may not commence without environmental authorization from the Competent Authority (i.e. DFFE). The proposed activity is identified in terms of Government Notice No. R. 327, 325 and 324 for activities which must follow a full Environmental Impact Assessment Process. The project will trigger the following listed activities:

Table 9: Listed activities in terms of NEMA: EIA Regulations 2014 (as amended), applicable to the proposed project

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Basic Assessment Activities as set out in Listing Notice 1		
11 (i)	<p>GN R. 327 (as amended) Item 11: The development of facilities or infrastructure for the transmission and distribution of electricity—</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	One (1) new 11kV - 33/132kV on-site substation consisting of two (2) portions: IPP portion / yard (11-33kV portion of the shared 11-33kV/132kV portion) (2ha) and an Eskom portion (2ha) (132kV portion of the shared 11-33kV/132kV portion which will be prepared and assessed under separate BA) including associated equipment and infrastructure, occupying a total area of approximately 4ha within the greater 25ha substation assessment area.
12 (ii) (a) (c)	<p>GN R. 327 (as amended) Item 12: The development of:</p> <p>ii) infrastructure or structures with a physical footprint of 100 square metres or more;</p> <p>where such development occurs-</p> <p>(a) within a watercourse;</p> <p>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<p>Drainage lines and watercourses are scattered across the proposed site. Roads, underground cables and/or powerlines will cross these watercourses or drainage lines or be within 32m thereof.</p> <p>The proposed developments will therefore entail the construction of infrastructure with physical footprints of approximately 100m² or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse.</p>
14	GN R. 327 (as amended) Item 14: The development and related operation of	The proposed development will include the construction of an on-site

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m ³ or more but not exceeding 500m ³ .	<p>BESS using Lithium-ion technology. The BESS will be up to 4ha in extent.</p> <p>It should be noted that no stand-alone facilities for the storage of dangerous goods external to the BESS will be constructed as part of the proposed development.</p>
19	GN R. 327 (as amended) Item 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	<p>The proposed development involves the construction of a WEF as well as other associated infrastructure (including the IPP portion/ yard of the 11-33kV/132kV shared on-site substation, up to 11-33kV overhead and / or underground cabling, roads and BESS) within the proposed project site.</p> <p>Although the development footprint of the site area has been designed to avoid the identified surface water features / watercourses as far as possible, some of the internal infrastructure to be constructed will need to traverse surface water features / watercourses. In addition, during construction, soil will need to be removed from surface water features / watercourses for construction purposes where unavoidable.</p>
24 (ii)	<p>GN R. 327 (as amended) Item 24: The development of a road -</p> <p>ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.</p>	<p>Internal roads are required within the project site to provide access to each wind turbine, the shared 11-33kV/132kV on-site substation, as well as to facilitate access throughout the WEF.</p> <p>The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		<p>they will be rehabilitated back down to 8m or less.</p> <p>Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route;</p> <p>During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Internal roads will have a final servitude of 8m during operation. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary.</p>
28 (ii)	<p>GN R. 327 (as amended) Item 28: Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</p>	<p>The total area to be developed for the proposed renewable energy facilities is greater than 1ha and occurs outside an urban area in an area currently zoned as agricultural land.</p>
56 (ii)	<p>GN R. 327 Item 56: The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -</p> <p>(ii) where no reserve exists, where the existing road is wider than 8 metres –</p>	<p>Existing roads may require widening by more than 6m and/or lengthening by more than 1km, to accommodate the movement of heavy vehicles and cable trenching activities associated with the WEF and associated infrastructure.</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
Relevant Scoping and EIA Activities as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended		
1	GN R. 325 (as amended) Item 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,	The proposed development will entail the construction of a WEF where the respective electricity output will be up to approximately 240MW. In addition, the proposed WEF developments will be located outside urban areas.
15	GN R. 325 (as amended) Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation.	The proposed WEF development will involve the clearance of more than 20ha of indigenous vegetation. Clearance will also be required for the proposed 11-33/132kV shared on-site substation, O&M building, BESS, construction laydown area, guard house, internal access roads, underground cabling and other associated infrastructure.
Relevant Basic Assessment Activities as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended		
3 (i)	GN R. 324 (as amended) Item 3: The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower— (b) will exceed 15 metres in height— i. Western Cape i. All areas outside urban areas.	The development of the WEF facility and associated infrastructure will consist of a mast tower used for telecommunication broadcasting and will exceed 15 metres in height. The mast will be located outside urban areas.
4 i. (ii) (aa)	GN R. 324 (as amended) Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	The development of the WEF facilities and associated infrastructure is likely to require the development of roads wider than 4m with a reserve of less than 13.5m within areas classified as CBA. These roads will occur within the Western Cape Province, outside

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
		urban areas. The provincial CBA spatial data for the Western Cape indicates that majority of the project site falls within the Ecological Support Areas and a small portion of the site overlaps with areas classified as Critical Biodiversity Areas.
10(i)(ii)	<p>GN R. 324 (as amended) Item 10: The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres</p> <p>i. Western Cape ii. All areas outside urban areas</p>	The proposed WEF and associated infrastructure will include the storage and handling of goods such as transformer oils and lubricants (considered dangerous) between 30 to 80 cubic metres in the substation area that will need to be authorised outside an urban area
12(i)(ii)	<p>GN R. 324 (as amended) Item 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.</p> <p>i. Western Cape ii. Within critical biodiversity areas identified in bioregional plans</p>	<p>The proposed WEF development will involve the clearance of more than 300m² or more for the proposed on-site substation, O&M Building BESS, construction laydown area internal roads, underground cabling, guard house and other associated infrastructure.</p> <p>The provincial CBA spatial data for the Western Cape indicates that majority of the project site falls within the Ecological Support Areas and a small portion of the site overlaps with areas classified as Critical Biodiversity Areas.</p>
14(ii)(a)(c)(i)(ii)(ff)	<p>GN R. 324 (as amended) Item 14: The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p>	<p>The proposed development will entail the development of infrastructure with physical footprints of 10m² or more within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature.</p> <p>Although the layouts of the respective proposed developments will be</p>

Activity No(s):	Relevant activities as set out in Listing Notices 1, 2 and 3 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
	<p>(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;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>i. Western Cape i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>designed to avoid the identified surface water features / watercourse as far as possible, some of the infrastructure / structures will likely need to traverse the identified surface water features / watercourses.</p> <p>The construction of the infrastructure (Substation, BESS, O&M building, construction laydown area, guard house, underground MV cabling / powerlines and roads) for the development will occur within Critical Biodiversity Areas (CBAs) located outside of urban areas.</p>
18 i. ii. (aa)	<p>GN R. 324 (as amended) Item 18: The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometer-</p> <p>i. Western Cape ii. All areas outside urban areas: (aa) Areas containing indigenous vegetation</p>	<p>Access and internal roads requiring widening of more than 4 meters and / or lengthening of more than 1 kilometer will be required to access the wind turbines as well as the associated infrastructure for areas outside the Western Cape within areas containing indigenous vegetation.</p> <p>Existing roads will be used wherever possible.</p>

7. NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL

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

7.1 Kraaltjies WEF

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

Table 10: Site Sensitivity Verification

Theme	Sensitivity	Comment
Agriculture Theme	Medium	<p>The Agricultural Compliance Statement is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The medium agricultural sensitivity, as identified by the screening tool, is confirmed by the specialist. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 160 mm per annum and high evaporation of approximately 1,390 mm per annum) proves the area to be arid, and therefore of limited land capability. Moisture availability is insufficient for the cultivation of crops without irrigation. In addition, the land type data shows the dominant soils to be very shallow soils on underlying rock.</p>
Animal Species Theme	High	<p>The Terrestrial Ecological Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The DFFE screening tool indicates a high & medium sensitivity rating for the study.</p> <p>The DFFE screening tool results include important species (High Sensitivity), namely the Critically Endangered Riverine Rabbit (<i>Bunolagus monticularis</i>). Riverine rabbits are habitat-specific associated with dense patches of riverine bush along seasonal rivers similar to those found downstream of the site. The Riverine rabbit is the only indigenous burrowing species in Africa, and thus requires deep, soft alluvial soils. It is therefore important that the Alluvial Wash Floodplains with riparian areas, which also contain both <i>Lycium</i> and <i>Salsola</i> plant species, a favoured food source for this rabbit, are avoided as far as possible by the proposed development.</p>

Theme	Sensitivity	Comment
		<p>Furthermore, species of conservation concern (SCC), namely, Martial Eagle (Globally and Regionally Endangered), Karoo Korhaan (Regionally Near Threatened) and Ludwig's Bustard (Globally and Regionally Endangered) were observed on the project site during the field survey.</p> <p>The classification of High Sensitivity is confirmed. Species of conservation concern have been observed at the application site and were recorded during the pre-construction monitoring surveys conducted across four seasons in 2020 and 2021.</p> <p>This site sensitivity verification verifies the site as being of high sensitivity.</p>
Aquatic Biodiversity Theme	Very High	<p>The Aquatic Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the study area. The DFFE ratings were based on the presence of Rivers and NFEPA's. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool.</p>
Archaeological and Cultural Heritage Theme	Low	<p>The Heritage Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The DFFE screening tool indicated low sensitivity rating for the project site. The low rating as provided by the Environmental Screening Tool possibly reflects scarcity of heritage reports conducted in the region. The field work that was conducted in the study area demonstrates that there are in fact burial grounds and historical structures of heritage significance that warrant conservation.</p> <p>The site sensitivity verification concluded that the low rating as provided by the Environmental Screening Tool likely reflects the scarcity of heritage reports conducted in the region. The DFFE screening tool is not fully supported based on the findings of the field work.</p>

Theme	Sensitivity	Comment
Avian (Wind) Theme	High	<p>The Avifaunal Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>According to the DFFE national screening tool, the habitat within the development site is classified as High sensitivity for birds according to the Animal Species Theme. The High sensitivity classification for birds is linked to Martial Eagle. The Medium classification is linked to Black Harrier, Southern Black Korhaan and Ludwig's Bustard. The High classification is confirmed based on the observed presence of Martial Eagle, Karoo Korhaan and Ludwig's Bustard during the field surveys carried out at the WEF application site. The classification of High Sensitivity is confirmed. Species of conservation concern have been observed at the application site and were recorded during the pre-construction monitoring surveys conducted across four seasons in 2020 and 2021.</p>
Bats (Wind) Theme	High	<p>The Bat Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>As indicated in the Screening Tool Site Sensitivity Map, the project site is classified as high sensitivity mainly due to the availability of natural water resources.</p> <p>The Site Sensitivity Verification Report indicates that area proposed for the Kraaltjies WEF has high bat sensitivity. Some drainage lines, with relatively larger trees and denser bushes, are particularly conducive to bat activity. The site sensitivity as depicted by the Screening Tool, is partially correct, indicating areas of high sensitivity.</p> <p>There are, however, low sensitivity areas where wind turbines will be developed.</p>
Civil Aviation (Wind) Theme	Low	The proposed development is not located close to any major airport and the entire site has a low sensitivity in terms of the civil aviation theme. No further specialist study required.
Defence (Wind) Theme	Low	The entire site has a low sensitivity in terms of the defence theme. No further specialist study required.

Theme	Sensitivity	Comment
Flicker Theme	Very High	<p>The Visual Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The areas of Very High Sensitivity identified by the Screening Tool on the Kraaltjies WEF application site largely align with the presence of natural features such as mountain tops, high ridges and steep slopes,</p> <p>The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area. Under this theme, potential flicker receptors have been identified on the site, or within 1 km of the site boundary. Buffers demarcated around these receptors have been assigned a “very high” sensitivity rating.</p> <p>The presence of receptors, either on the Kraaltjies WEF application site, or within 1km of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using Google Earth showed that there were no receptors present at some of the locations identified by the National Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 1km buffer. As such, the areas identified as sensitive during the course of the specialist Visual Impact Assessment and associated field work have been verified.</p>
Landscape (Wind) Theme	Very High	As above for the flicker theme.
Palaeontology Theme	Very High	<p>The Heritage Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>DFFE Screening Tool indicated that the entire project areas are of Very High Palaeosensitivity. Due to the scarcity of well-preserved, scientifically important fossils over much of this region, based on desktop studies and fieldwork, it is inferred that most parts of the project areas are in practice of LOW palaeontologically sensitivity. Areas underlain by thick alluvial sediments here are generally of LOW sensitivity, although important concentrations of Caenozoic mammal remains might occur here. The</p>

Theme	Sensitivity	Comment
		palaeosensitivity mapping shown by the DFFE Screening Tool is contested here.
Noise Theme	Very High	<p>The Noise Report is included in Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>The project could impact on several noise sensitive areas. A full noise impact assessment has been undertaken. It was found that there are a number of areas identified (by the online screening tool) to have a “Very High” sensitivity to noise. The site assessment highlighted that these are not sensitive to noise, as there are no structures used for residential activities or any other use that are considered to be noise sensitive. In other areas defined to be of very high sensitivity by the screening tool there are permanent residential activities. These locations are considered to have a “Very High” sensitivity to noise.</p>
Plant Species Theme	Medium	<p>The Terrestrial Ecological Report is included Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of CBAs, Ecological Support Areas, NFEPAs and rivers. The remaining area within the development footprint is deemed to be of Medium or Low sensitivity.</p> <p>The DFFE Screening Tool lists Plants <i>Peersia frithii</i>, Species 383, Species 1039, which were actively searched for, but suitable habitat and or the presence / absence of this species was not confirmed. Most of these are associated with fynbos and or rocky outcrop environments, not found within the proposed development areas.</p> <p>Similar to the screening tool the area within the development is deemed to be of Medium, therefore the medium sensitivity for the plants theme was confirmed.</p>
RFI (Wind Theme)	Low	The screening tool described the study area as low Radio Frequency Interference Theme (RFI) sensitivity. The site is located 60km from a Weather Radar installation. No further specialist study required. Similar to the screening tool the area within

Theme		Sensitivity	Comment
			the development is deemed to be of low RFI theme sensitivity.
Terrestrial Theme	Biodiversity	Very High	<p>The Terrestrial Ecological Report is included Appendix 6 of the <u>Final</u> Environmental Impact Assessment Report.</p> <p>Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of CBAs, Ecological Support Areas, NFEPAs and rivers.</p> <p>The DFFE Screening Tool identified three sensitivity ratings within the development study area, very high, medium and low. Although there is some overlap with the findings on site and the Screening Tool's outcome, the extent of the Very High sensitivity areas was found to be greater than the extent in the Screening Tool. The presence of these Very High Sensitivity features was confirmed during the assessment.</p> <p>However, an appropriate layout can be developed to minimise the impact on the Very High areas but must be verified once the final layout inclusive of roads has been developed.</p>

8. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

8.1 Geographical

The proposed WEF is located approximately 52km south of Beaufort West in the Western Cape Province and is within the Beaufort West Local Municipality, in the Central Karoo District Municipality. The regional context of the proposed application site is shown in **Figure 6** below.

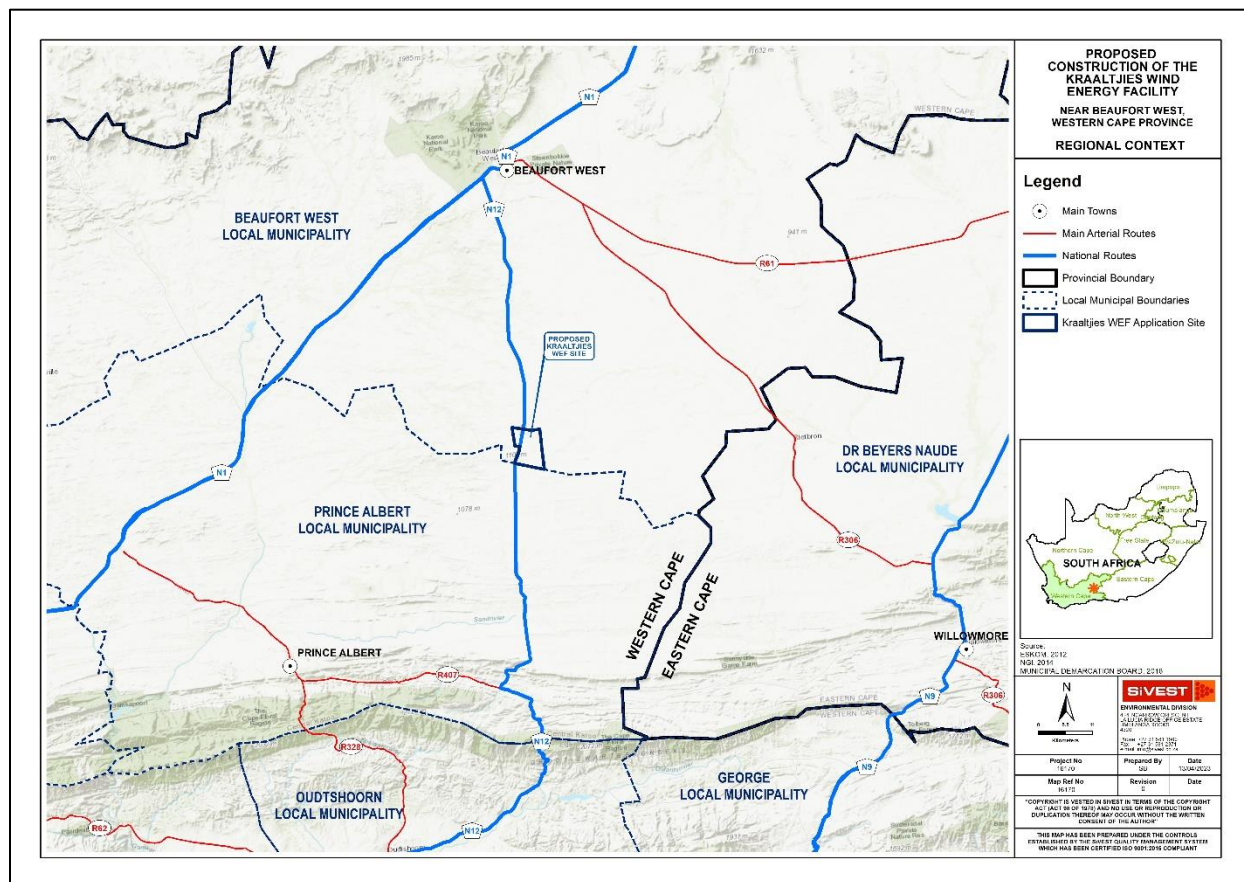


Figure 6: Regional context

8.2 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2018), much of the assessment area is classified as “Bare / Barren Land”, interspersed with patches of low shrubland. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover. Small tracts of grassland and forested land occur along drainage lines throughout the study area.

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

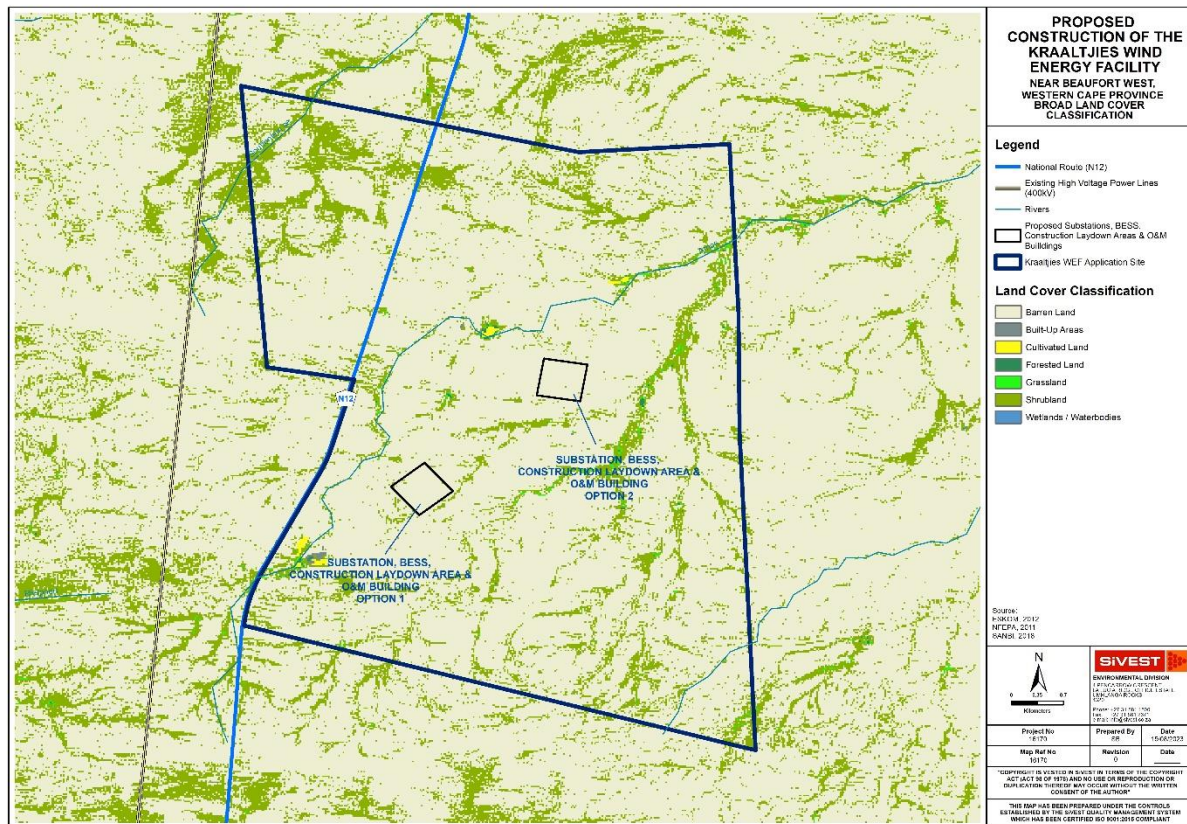


Figure 7: Land Cover Classification

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (mostly sheep) and game farming is the dominant activity although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence. Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills (**Figure 10**).



Figure 8: Sheep grazing in the study area



Figure 9: Isolated farmsteads typical of the Kraaltjies WEF study area



Figure 10: Typical farm buildings and associated infrastructure

8.3 Climate

The climate of the area is characterized by a hot semi-arid climate. Beaufort West receives a relatively low mean annual precipitation of 392 mm. The average lowest rainfall is received in June (15 mm) and the highest in March (57 mm), which is a seasonal variation of 42 mm. The maximum midday temperatures for Beaufort West ranges from 31.7°C in January to 18°C in July. The minimum temperatures for Beaufort West ranges from 16.6°C in February to 4.4°C in July. The average temperatures vary during the year by 12.9°C.

8.4 Topography

The site proposed for the Kraaltjies WEF development is located in an area largely characterised by flat to gently undulating plains interspersed with low ridges and dry river courses. Areas of slightly greater relief associated with marginally higher elevations are largely concentrated in the southern sector of the study area. Flat to undulating terrain prevails across much of the WEF development site and along the grid connection corridors, with no steep slopes in evidence.



Figure 11: Typical terrain in the Kraaltjies WEF study area including undulating plains interspersed with low ridges.



Figure 12: View north across the Kraaltjies WEF project site

8.5 Geology and Soils

A desktop geotechnical assessment was undertaken by Gage Consulting (Pty) Ltd (January 2023). According to the report, the study area is underlain by Permian-aged alternating bluish-grey, greenish grey or greyish red mudrocks and grey, very fine to medium-grained lithofeldspathic sandstone of the Teekloof and Abrahamskraal Formations that form the Adelaide Subgroup of the Beaufort Group found in the Karoo Supergroup (**Figure 11**). The formations boundaries are linked to specific sandstone-rich marker units (Johnson et al 2006). A number of greenish chert bands, existing from a few centimetres to two metres thick, and pink tuff beds have been recorded to exist in the Abrahamskraal Formation. Calcareous nodules and concretions occur in mudstones throughout the Beaufort Group.

Adelaide Subgroup is highly faulted with numerous anticline and syncline formations, as well as a few faults, striking generally in an east-west direction. The rock units of the Beaufort Group in the vicinity of the site dip towards the north and south, due to numerous anticline and synclines, varying between dip angles of 10° and 40°. The rocks in the Beaufort Group are fossil bearing and fossil locations near the site have been noted, as show in the local geology map.

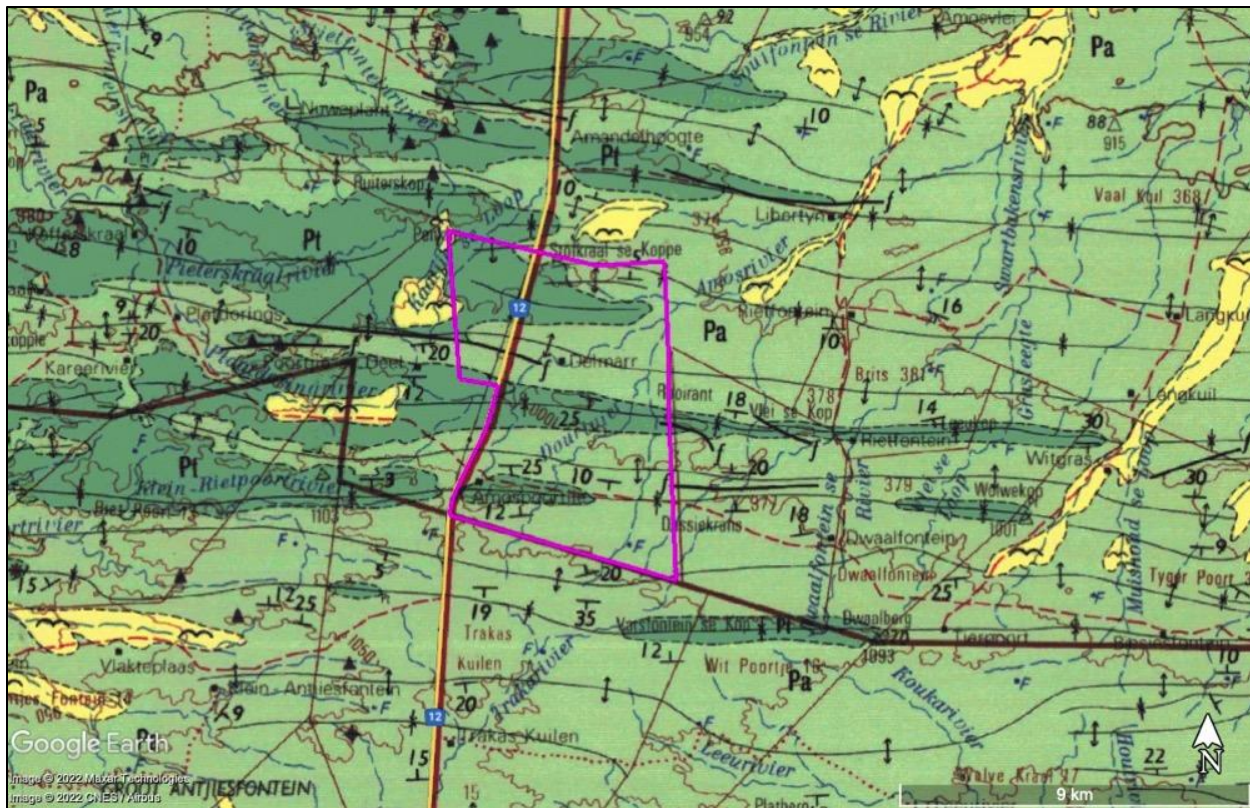


Figure 13: Excerpt from 1:250 000 Geological series map (3222, Beaufort West) showing locality of Kraaltjies WEF development (outer boundary in pink) over Abrahamskraal and Teekloof Formations of the Late Permian Beaufort Group.

8.6 Surface Water

An Aquatic Impact Assessment was undertaken by EnviroSci (Pty) Ltd (June 2023). According to the assessment, the study area contains a variety of aquatic features, characterised as follows:

- Non perennial rivers alluvial dominated channels with or without riparian vegetation (**Figure 14 & Figure 15**). These ranged from narrow channels within small canyons with steep cliffs to broad flood plain areas in the lower valleys. Many these systems with and without riparian vegetation are connect via the mainstem river systems listed below, thus with direct linkages. Only some of the bare alluvial systems in the southern portion of the site lack any direct connectivity.
- Minor drainage lines (**Figure 16**), with no obligate aquatic vegetation and were mostly 2 – 8m in width
- Dams or weirs with no wetland or aquatic features, although not many of these were located within the study area.

The features listed above, drain the study area in a north easterly region, forming part of the following Quaternary Catchments (**Figure 17**):

- L32A Amos / Swartbakens rivers (WEF)

Furthermore, the study area is located within the Great Karoo Ecoregion of the Tsitsikamma-Mzimvubu Water Management Area.



Figure 14: A watercourse with defined riparian zone associated with a Swartbakens River near the N12



Figure 15: Sandy/alluvial channel associated with the upper reaches of the Amos River that will be traversed by internal access roads



Figure 16: A view of a minor drainage with no obligate aquatic vegetation or habitats

No wetlands were found within the proposed development areas, only the riverine features such as alluvial floodplains and riparian thickets dominated by *Vachellia karroo*, *Searsia lancea*, *Euclea undulata*, *Gymnosporia buxifolia*, *Ficinia nodosa*, *Carex spp*, *Centella asiatica*, *Erianthus capensis*, *Sporobolus fimbriatus*, *Cynodon incompletes*, *Prosopis spp* (Exotic,) *Eragrostis curvula*, *Erharta calcyni*, *Merxmüllera disticha*, and *Cynodon dactylon* are found in close proximity to any of the proposed towers.

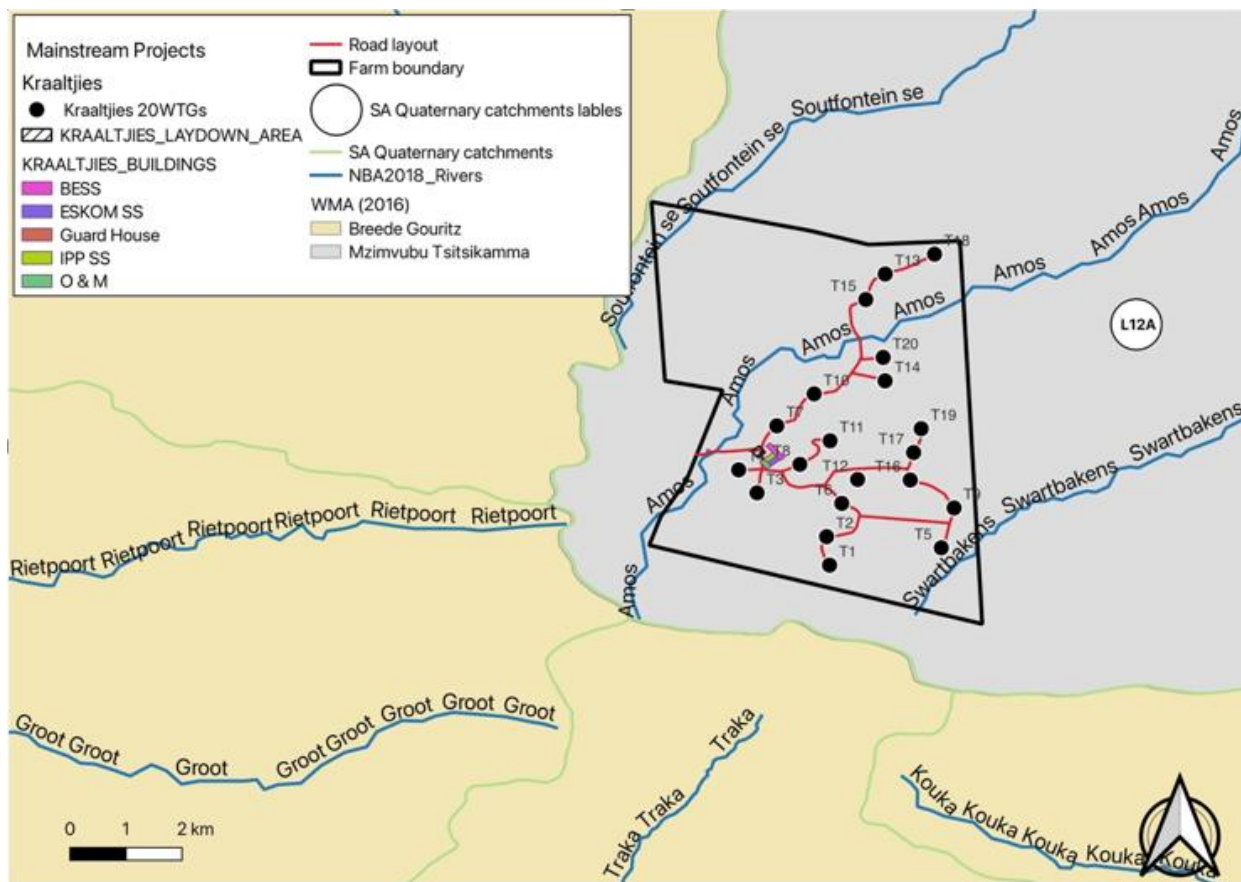


Figure 17: Project locality map indicating the various quaternary catchments and mainstream rivers (Source DWS and NGI) within the project boundary

Figure 16 indicates the available spatial data with regard potential wetlands and or riverine systems within the study area (van Deventer et al., 2020). During the field work, the site was then groundtruthed as well as compared to 1: 50 000 topocadastral surveys mapping data and that which was observed on site. A baseline map was then refined using the November 2021/February 2022 survey data (**Figure 17**).

As indicated previously, three natural aquatic systems were observed within the study area, namely the broader non-perennial rivers (with & without riparian vegetation) and the minor drainage lines. The fine scale delineation of the broader systems was focused on the proposed wind farm infrastructure, to ensure that turbines, buildings and any new internal access roads (as far as possible) avoided these areas. Due to the nature of the landscape, the small drainage lines are unavoidable, but these have also been avoided by the developable area as far as possible and most of the proposed buildings.

The presence of broader Alluvial wash floodplains, as these (although carrying water during high rainfall periods) are largely colonised by terrestrial species, and also form important potential Riverine Rabbit habitat when accompanied by riverine thicket dominated channels. These systems, which are considered part of the aquatic environment, exhibit little in terms of any functional obligate aquatic habitats and only

have water during very high rainfall periods. These systems, although different from the Riverine riparian channels are thus broadly associated with these systems. Both are dominated by sandy silts, but the Riverine riparian areas are dominated by taller stands of *Vachellia karroo* trees, supported by an understorey dominated by *Searsia lancea*, *Euclea undulata*, *Gymnosporia buxifolia* *Ficinia nodosa*, *Carex spp*, *Centella asiatica*, *Erianthus capensis*. The Alluvial Wash Floodplains are mostly barren sandy area, dominated by low growing shrubs such as, as well as *Pteronia pallens* and *Eriocephalus ericoides* species.

Although this habitat type could be rehabilitated easily, the conservation importance based on habitat function resulted in this unit being rated as Very High Sensitivity, represented in its status as a ESAs. For this reason, no towers are to be placed in any of these areas, however any internal roads should avoid these areas and make use of existing tracks or disturbed areas as far as possible.

The substation options do however intersection with one of the alluvial systems and for this reason should be relocated and or avoided in the alternative selection process.

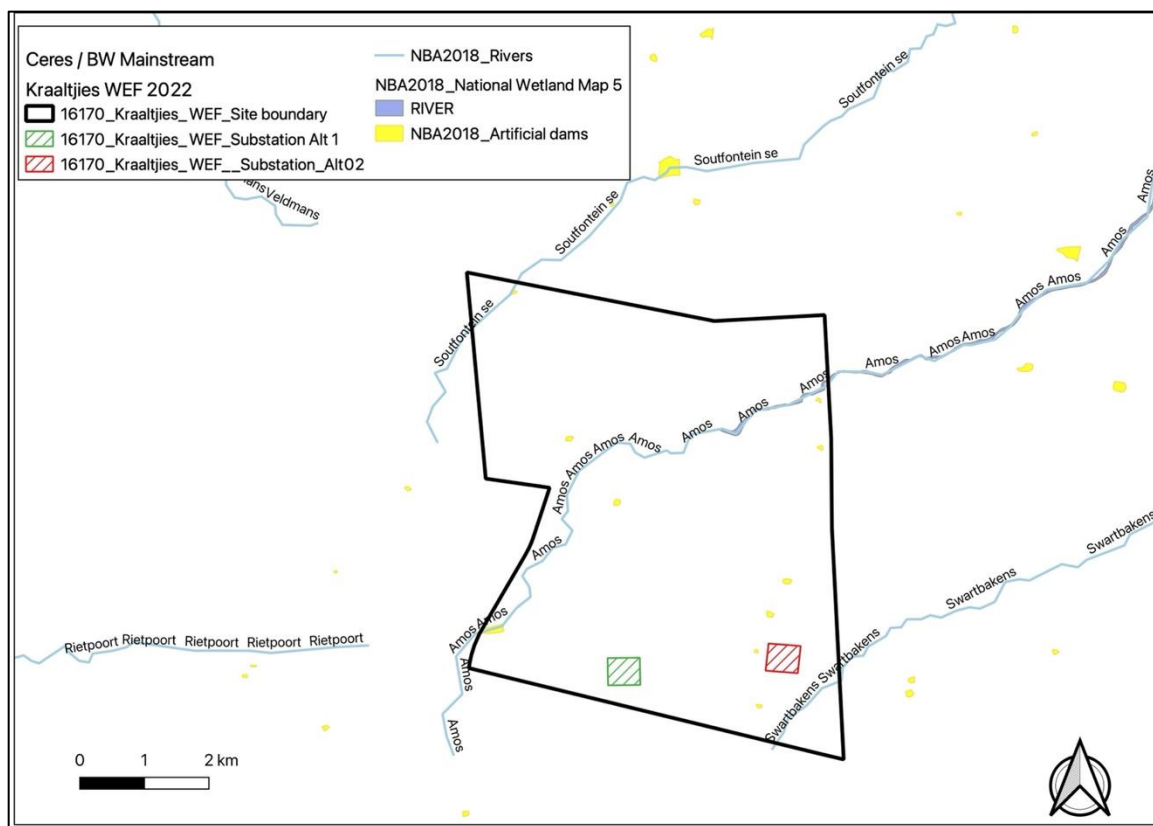


Figure 18: National Wetland Inventory wetlands and waterbodies (van Deventer et al., 2020)

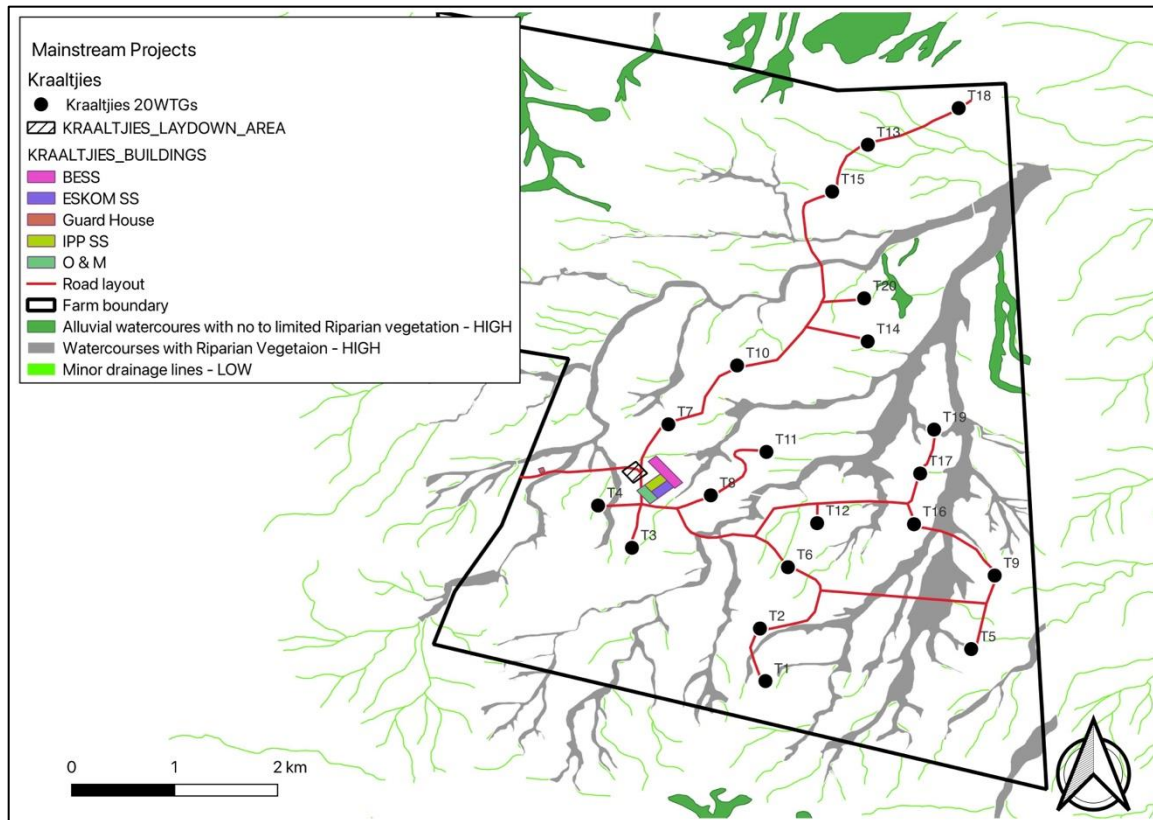


Figure 19: Waterbodies delineated in this assessment based on groundtruthing information collected

The DFFE screening tool indicated that several Very High aquatic sensitivity features were located within the study area. The DFFE ratings were based on the presence of Rivers and NFEPA. The presence of these Very High Sensitivity features was confirmed during this assessment, but also extended to include additional areas.

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

However, the present layout (except for several new watercourse crossings within or near existing roads/tracks) could avoid the High sensitivity areas, with the activities thus located within the Lower sensitivity areas according to the DFFE Screening Tool.

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

- Construction period = 10m
- Operation period = 8m

- Final = 10m

Artificial dams were not buffered.

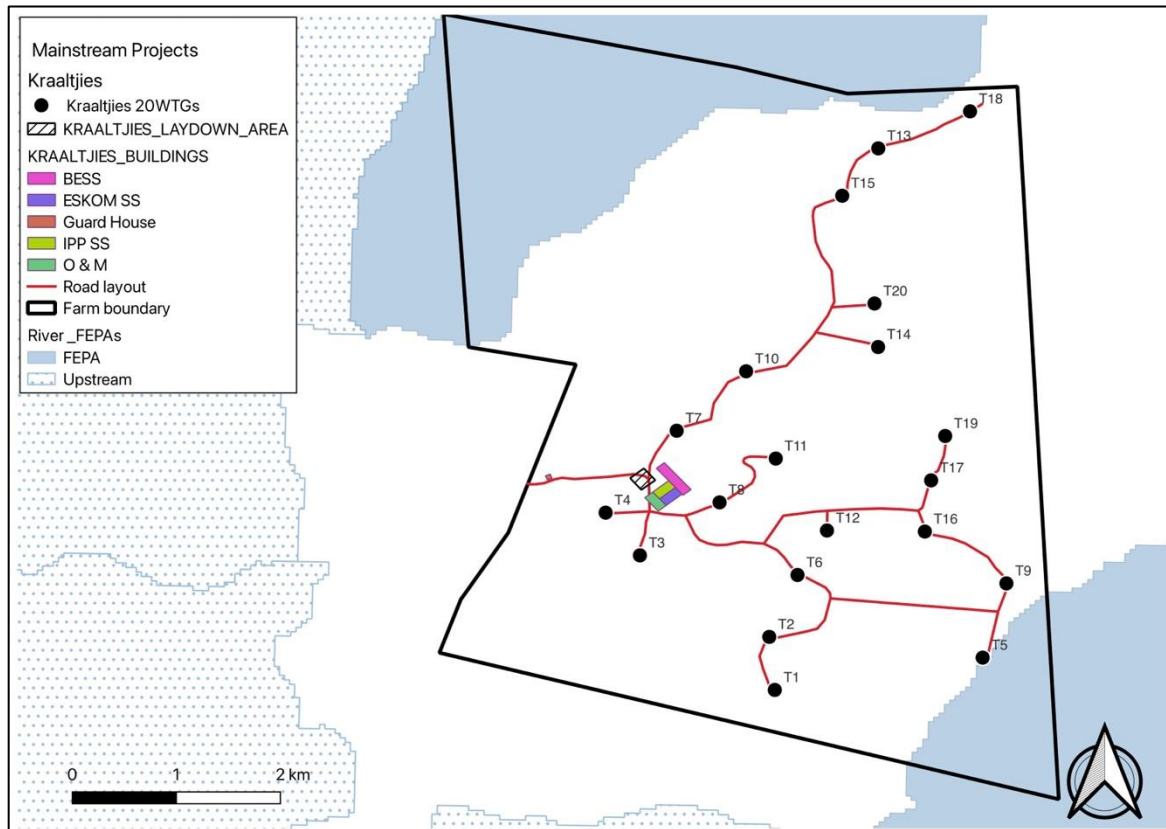


Figure 20: The Freshwater Ecosystem Priority Areas for the study site (Nel et al, 2011).

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

Table 11: Overview of sensitivity of various features as it relates to main project component types

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
WTG areas	Alluvial watercourses with limited riparian vegetation	No-Go with 10m buffer	N/A
	Watercourses with / riparian vegetation	No-go with 10m buffer	N/A
	Minor drainage lines	LOW with 10m buffer but should be avoided	N/A
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	N/A
Hardstands, Buildings / Substations & BESS	Alluvial watercourses with limited riparian vegetation	No-Go with 10m buffer	N/A
	Watercourses with / riparian vegetation	No-go with 10m buffer	N/A
	Minor drainage lines	LOW with 10m buffer but should be avoided	N/A
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	N/A
Roads	Alluvial watercourses with limited riparian vegetation	No-Go with 10m buffer	LOW if an existing crossing / road or impact is already present, that must then be included in the potential road network
	Watercourses with / riparian vegetation	No-Go with 10m buffer	
	Minor drainage lines	LOW with 10m buffer	

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
	Artificial dams	Not Applicable = If these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	N/A
Overhead Lines	Alluvial watercourses with limited riparian vegetation	Assumption is that the overhead lines could span these areas, but the towers/pylons should adhere to the buffer distances as indicated as far as practically possible as some of the alluvial system are very broad	
	Watercourses with / riparian vegetation		
	Minor drainage lines		
	Artificial dams		

8.7 Terrestrial Biodiversity

An Ecological Study was undertaken by EnviroSci (August 2022). According to the report, the Kraaltjies site is dominated by one terrestrial vegetation type, according to Mucina to and Rutherford (2007 – amended 2018) namely Gamka – Karoo (NKI1).

The Gamka-Karoo vegetation spans the entire site / study area with the presence / absence and abundance of plant species dependent on the slope and stability of the soils found present. Thus, the flat plains areas contained most of the plant and animal species known to occur within region, while the steep rock cliffs were more devoid of species. This is possibly linked to the fact that the soils in these areas are composed mostly of mudrock (shales), that weather and decompose easily, thus unstable, only allowing more hardy succulent species to colonise these areas.

None of these are listed as a Threatened Ecosystem as per the National Environmental Management Biodiversity Act, this is due to the vast area these vegetation units occupy, with little in terms of human / agricultural use.

A potential 900 species have been previously recorded in the Quarter Degree Square grid that cover the site (3222DA), of which ca. 80% are plant species. The remainder, which excludes birds and bats as these are assessed separately, include the following taxa:

- Mammals 36 Species

- Reptiles 16 Species
- Amphibians 5 Species
- Fish 0 Species
- Insects 74 Species
- Spiders / Scorpions 2 Species
- Fungi 2 Species

This was then compared to observation made within a 4-day site-specific assessment conducted in November 2021, and again in February 2022, conducted after a period of significant winter rains, more than previous years, which some response by the flora, but the prolonged drought in the region has affected that growth of the plants, especially those in the low-lying plains areas, that have shallow soils.

The vegetation observed within the study area corresponds with the descriptions associated with the National Vegetation Map (NSBA, 2018) and Mucina and Rutherford (2007) (**Figure 19**). In other words, an area that is covered by sparse dwarf shrubland on undulating plains, dominated by *Chrysocoma oblongifolia*, *Eriocephalus microphyllus* *E. ericoides* and *Searsia undulata*.

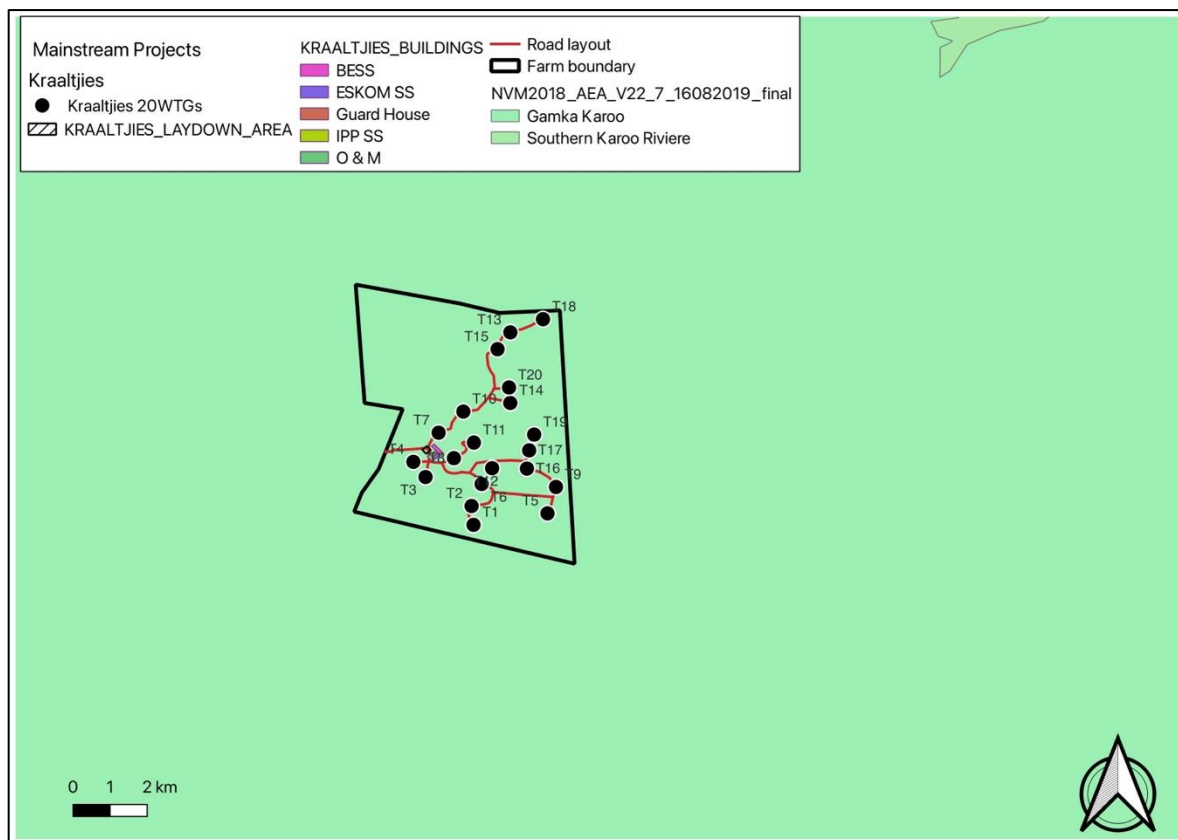


Figure 21: National Vegetation Map as per Mucina and Rutherford (2007) amended NBSA 2018

Based on observations made during the site visits, two key terrestrial habitats and the aquatic habitats (**Figure 20**) were observed and then rated based on their sensitivity to the proposed development. These habitats included:

1. Gamka Karoo vegetation unit
 - a. Shale / Mudrock Plains
 - b. Small ridges / inselbergs
2. Alluvial rivers with and without riparian vegetation (discussed in the Aquatic Assessment)

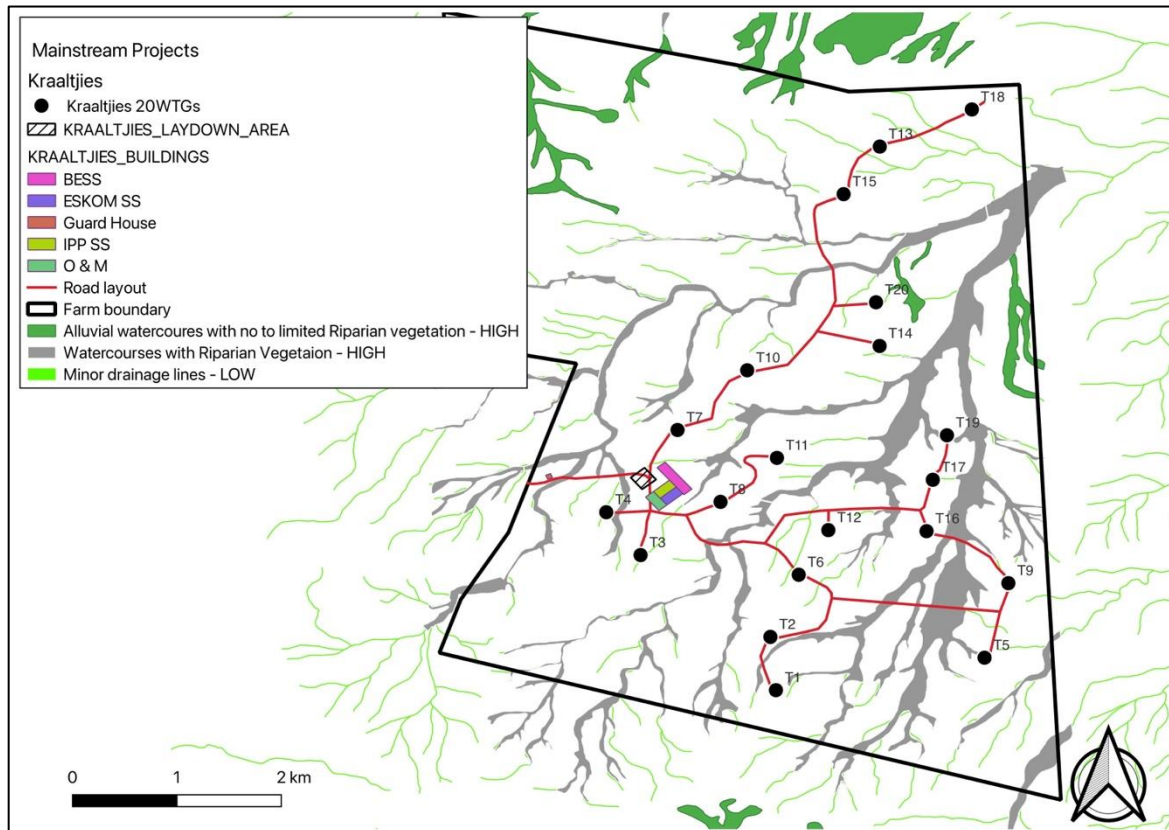


Figure 22: Spatial representation of the observed habitats, with the open remaining areas dominated by the plains Nama-Karoo vegetation type



Figure 23: A view from the northern of the site, dominated by the shale /mudstone (purple) soils and isolated ridges/cliffs and inselbergs in the background. The site is further dominated by the alluvial watercourses as shown in the foreground



Figure 24: A view of one the few cliffs within the site, that will be avoided by the placement of any turbines, and it's assumed that any of the proposed roads will also avoid any areas with any such slopes

Vegetation

No rare or listed plant species were observed during the survey period within the proposed turbine positions; however, several species are protected in terms of the Western Cape legislation (Provincial Nature Conservation Ordinance). The disturbance, destruction and/or relocation, whichever is more relevant, of these species would require the relevant permits from the provincial authority.

The DFFE Screening Tool lists Plants *Tritonia florentiae*, *Peersia frithii*, *Species 383*, *Species 1039*, which were actively searched for, but suitable habitat and or the presence / absence of this species was not confirmed. Most of these are associated with rocky outcrop environments and can avoided by the proposed development.

Fauna

As previously mentioned approximately 135 animal species have been previously observed within the quarter degrees square area associated with the study area. These are predominantly Mammal (26%), Reptile (12%) and Insect species (55%), which for the most part highly mobile and or habitat specific. These as listed in the Species Checklist created for the assessment were then searched for during the site visit. The only exception being the fish and amphibian species as no permanent or suitable habitat was observed within the study area, although habitats do occur downstream of the project area.

The DFFE screening tool results only include one important mammal species (High Sensitivity), namely the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Riverine rabbits are habitat-specific associated with dense patches of riverine bush along seasonal rivers similar to those found downstream of the site. The Riverine rabbit is the only indigenous burrowing species in Africa, and thus requires deep, soft alluvial soils. It is therefore important that the Alluvial Wash Floodplains with riparian areas, which also contain both *Lycium* and *Salsola plant species*, a favoured food source for this rabbit, are avoided as far as possible by the proposed development.

Two of the Endangered reptile *Cherobius boulengeri* ("Dwarf" Karoo padloper) were observed outside of the proposed wind farm boundary, but within the adjacent farm portions, thus it must be assumed that this species will occur within the site. Therefore, considerable caution is advised during the construction period for the potential disturbance of this small animal species, especially during the vegetation clearing process, thus an Environmental Officer must ensure that none are present during this phase within the proposed works area for the day.

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

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

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

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

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

- All tortoises [2 species observed which include Angulate tortoise (*Chersina angulate* - Plate 3), Dwarf Karoo Padloper (*Cherobius boulengeri*);
- All lizards;

- All frogs;
- Most snakes [2 species have been observed in the past on site, namely Cape cobra (*Naja nivea*) and Mole snake (*Pseudoaspis cana*);
- All indigenous antelope;
- Aardvark;
- Most small carnivores such as Honey Badger, Cape Fox, Bat-eared Fox;
- Large Grey Mongoose etc.; and

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



Figure 25: A common site with the study area, namely Angulate tortoises (*Chersina angulata*) and Corncricket (*Hetrodes pupus pupus*)



Figure 26: Several interesting plants occur within the region and include in a clockwise direction, *Eriospermum paradoxum*, remnants of a *Gonialoe variegata* (syn. *Aloe variegata*) specimen, also known as tiger aloë and partridge-breasted aloë, *Mesembryanthemum resurgens* and *Hoodia dregei*, an endemic to the greater study area.

The Western Cape Provincial Biodiversity Spatial Plan Critical Biodiversity Area (CBA) spatial layers indicate that with the exception of the substations all of the proposed towers are located outside of the CBAs as depicted in the below figure.

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

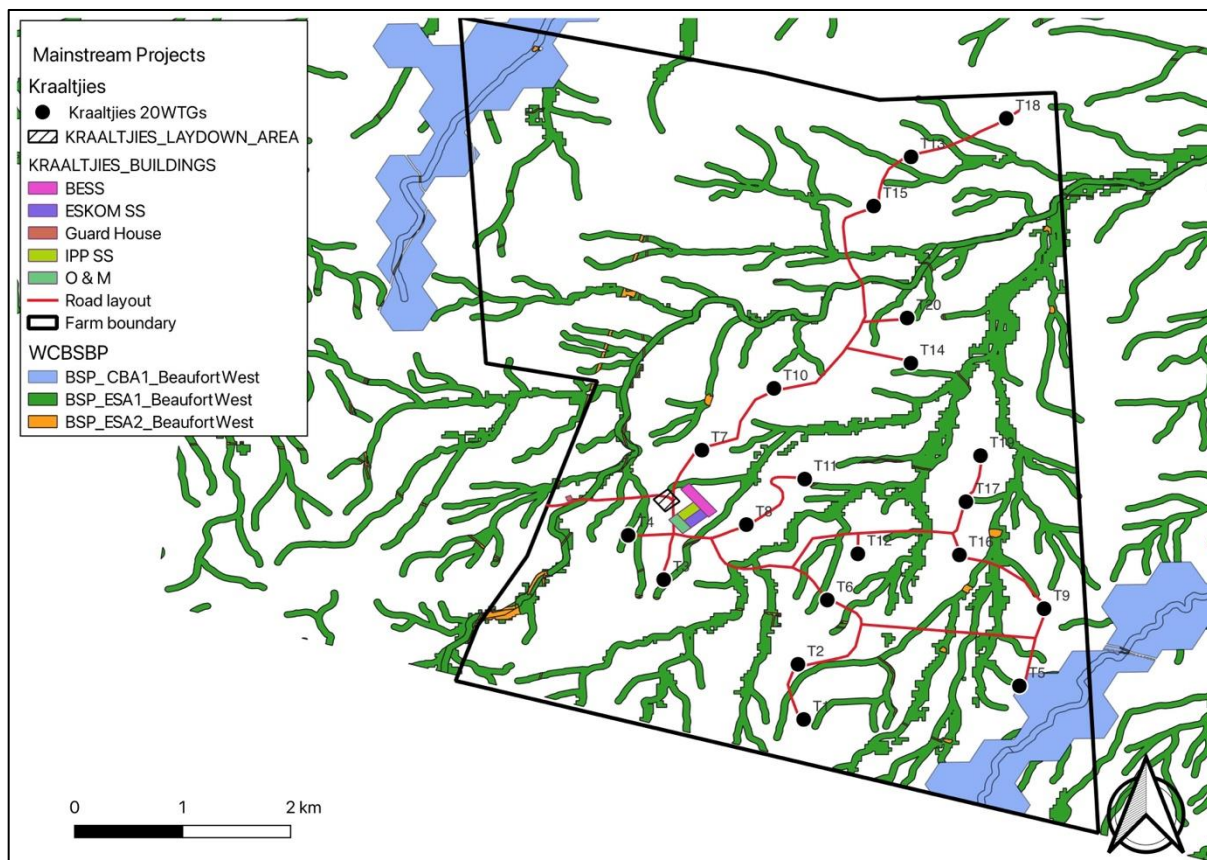


Figure 27: The Critical Biodiversity Areas as per the Western Cape Biodiversity Spatial Plan (2017)

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

Table 12: Overview of sensitivity of various features as it relates to main project component types

Development Component	Habitat type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
WTG areas	Steep slopes / cliffs and small Inselbergs	No-go	N/A
	Remaining areas	Low – thus acceptable	N/A
Hardstands, Buildings / Substations & BESS	Steep slopes / cliffs and small Inselbergs	No-go	N/A
	Remaining areas	Low – thus acceptable	N/A
Roads	Steep slopes / cliffs and small Inselbergs	No-go	LOW if an existing crossing / road or impact is already present, that must then be included in the potential road network inclusive of any upgrades
	Remaining areas	Low – thus acceptable	N/A
Overhead Lines	Steep slopes / cliffs and small Inselbergs	These should be spanned with no towers	
	Remaining areas	Low – thus acceptable	

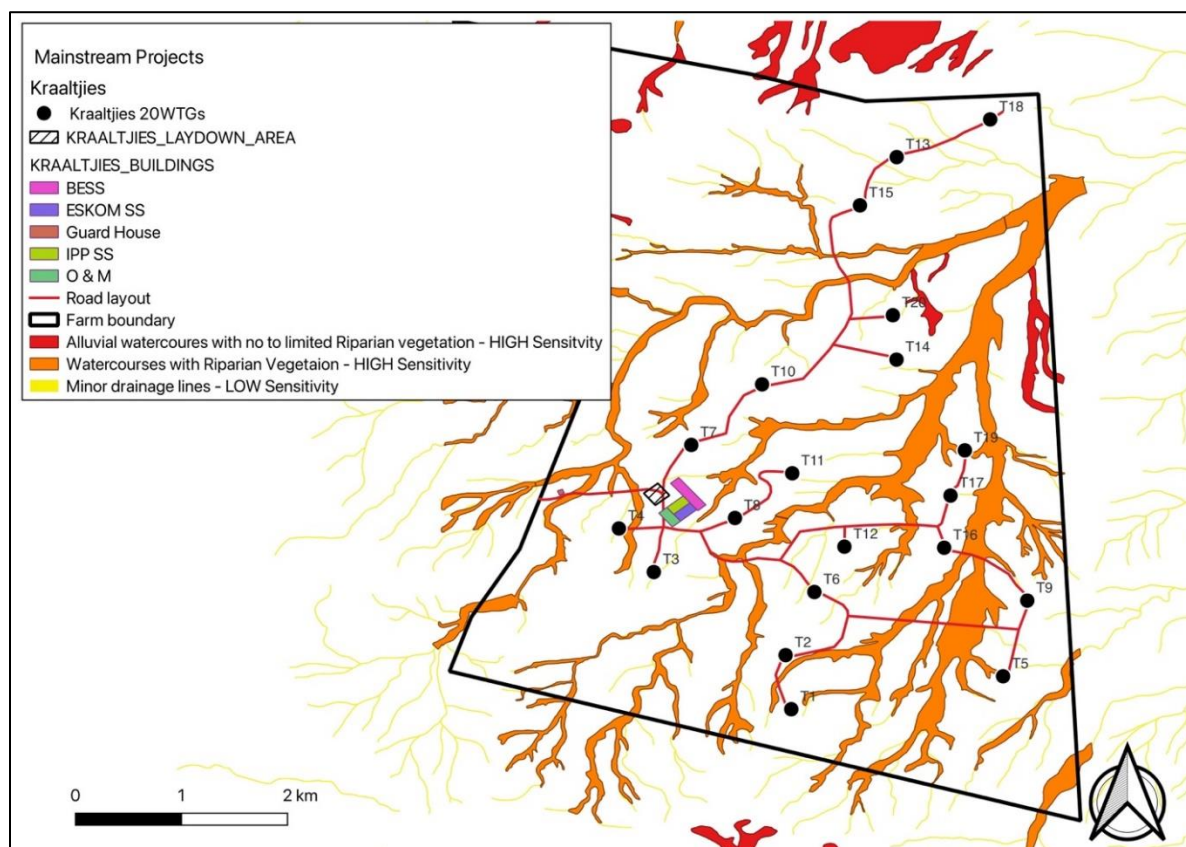


Figure 28: Habitat sensitivity map inclusive of terrestrial and aquatic habitats assessed

8.8 Agricultural

An agricultural compliance statement and site sensitivity verification was undertaken by Johann Lanz (August 2023). According to the report, the site has very low agricultural potential because of, climate constraints, and soil constraints. The site is unsuitable for cultivation, and agricultural land use is limited to grazing.

Cultivation within the application area is confined to small, isolated patches of mostly pasture or fodder crops around farmsteads. There are three farmsteads across the site that have such cultivated land, only one of which is identified on the screening tool in the south-west corner of the site. Across the rest of the site, agricultural sensitivity is purely a function of land capability. The land capability of the site on the screening tool is predominantly 5 but varies from 2 to 9. Values of 2 to 5 translate to a low agricultural sensitivity, values of 6 to 8 translate to a medium agricultural sensitivity, and values of 9 translate to a high agricultural sensitivity. There are only scattered pixels of 9 (high sensitivity), associated with one of the land types, across the site (refer to **Figure 26**).

As the environment is unsuited to cultivation, the differences in land capability across the project area are not very significant and are more a function of how the land capability data is generated by modelling, and strongly influenced by terrain in this environment, than actual meaningful differences in agricultural potential on the ground.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate, and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

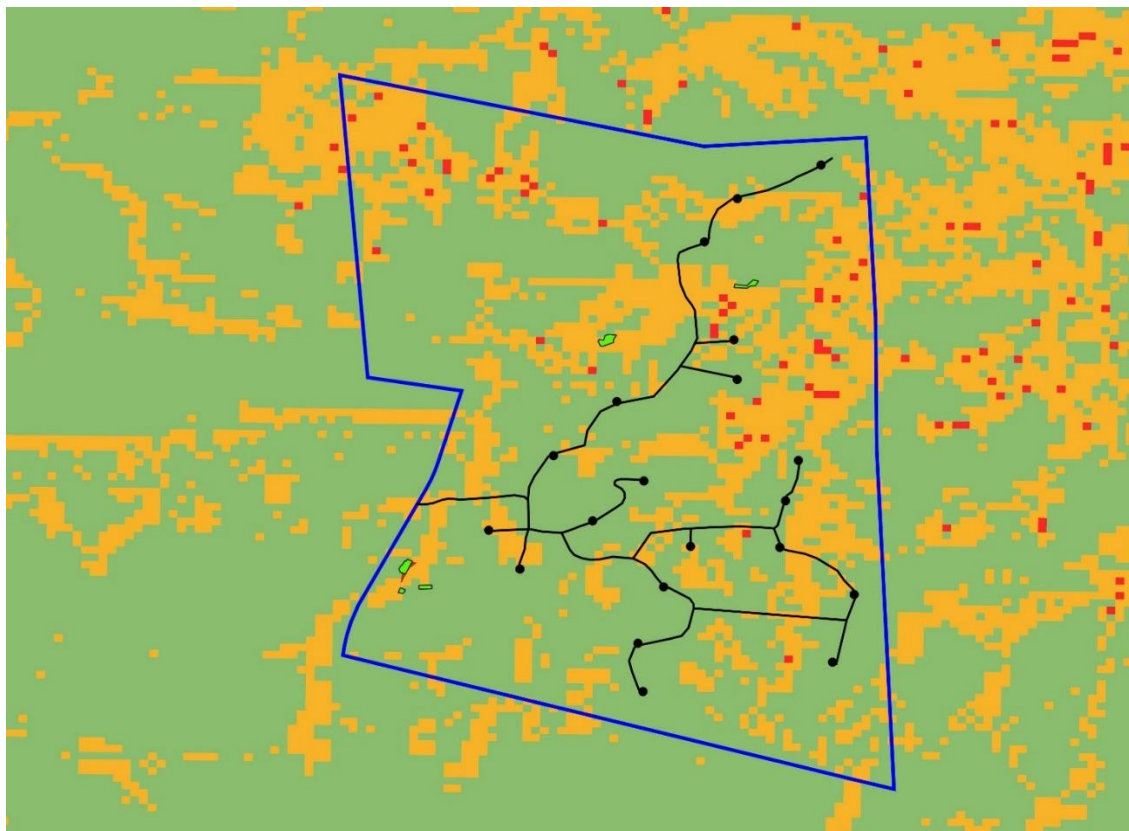


Figure 29: Agricultural sensitivity as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high).

The allowable development limit on land of low and medium agricultural sensitivity with a land capability of < 8, as this site has been verified to be, is 2.5 ha per MW. This would allow a 240 MW facility to occupy an agricultural footprint of 600 hectares. This allowable development limit is designed to allow solar PV developments on such land. The wind facility and associated infrastructure being assessed will occupy an agricultural footprint of < 72 hectares. It is therefore confirmed that the agricultural footprint of this development will be well within the allowable limit. It will in fact be approximately eight times smaller than what the development limits allow.

the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of very limited land capability and is not suitable for the production of cultivated crops, the amount of agricultural land loss is well within the allowable development limits prescribed by the agricultural protocol, the proposed development offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits, and that the proposed development poses a low risk in terms of causing soil degradation. Furthermore, the roads were revised based on the Cultural Landscape Assessment requirements and was provided to the specialist, who confirmed that the proposed layout is acceptable and no update to the report is required.

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

8.9 Avifauna

An Avifaunal Assessment was undertaken by Chris van Rooyen Consulting (September 2022). According to the assessment, it is estimated that a total of 168 bird species could potentially occur in the broader area. Of these, 20 species are classified as priority species for wind developments. The Karoo National Park Important Bird Area (IBA) SA102 is the closest IBA and is located approximately 50km north of the application site at its closest point (Marnewick et al. 2015). The development is not expected to have any impact on the avifauna in this IBA due to the distance from the project site. **Table 13** below list all the priority species and the possible impact on the respective species by the proposed WEF.

LC = Least Concern

NT = Near threatened

VU = Vulnerable

EN = Endangered

H = High

M = Medium

L = Low

Table 13: Wind energy priority species recorded in the broader area.

Species	Taxonomic name	SABAP2 Reporting rate		Conservation Status		Recorded during field surveys	Likelihood of regular occurrence at site	Habitat						Impacts				
		Full protocol	Ad hoc protocol	Global status	Regional status			Karoo scrub	Surface water	Drainage line woodland	Alien trees	Agricultural fields	High voltage powerlines	Collisions with turbines	Displacement: Habitat transformation	Displacement: Disturbance	Electrocution: MV lines	Collisions: MV lines
African Harrier-Hawk	<i>Polyboroides typus</i>	0,00	0,45	-	-		L		x	x	x			x	x	x	x	
Amur Falcon	<i>Falco amurensis</i>	0,00	0,45	-	-		L			x	x	x	x	x	x			
Black Harrier	<i>Circus maurus</i>	2,53	0,00	EN	EN		L	x	x					x	x		x	
Black-winged Kite	<i>Elanus caeruleus</i>	1,27	0,45	-	-		L	x		x	x	x	x	x	x			
Blue Crane	<i>Grus paradisea</i>	2,53	0,45	VU	NT		L	x	x				x	x	x	x		x
Booted Eagle	<i>Hieraaetus pennatus</i>	5,06	0,45	-	-	x	M	x	x	x	x	x		x	x		x	
Common Buzzard	<i>Buteo buteo</i>	1,27	0,00	-	-		L	x	x	x	x	x	x	x	x		x	
Double-banded Courser	<i>Rhinoptilus africanus</i>	11,39	2,25	-	-		M	x						x	x	x		x
Greater Kestrel	<i>Falco rupicoloides</i>	12,66	10,36	-	-	x	H	x		x	x	x		x	x		x	
Jackal Buzzard	<i>Buteo rufofuscus</i>	1,27	0,90	-	-		L	x	x	x	x	x	x	x	x		x	
Karoo Korhaan	<i>Eupodotis vigorsii</i>	72,15	21,62	-	NT	x	H	x						x	x	x		x
Kori Bustard	<i>Ardeotis kori</i>	2,53	0,45	NT	NT		M	x		x				x	x	x		x
Lanner Falcon	<i>Falco biarmicus</i>	1,27	0,00	-	VU		L	x	x	x	x	x	x	x	x		x	
Ludwig's Bustard	<i>Neotis ludwigii</i>	13,92	2,70	EN	EN	x	H	x					x	x	x	x		x
Martial Eagle	<i>Polemaetus bellicosus</i>	5,06	1,35	EN	EN	x	H	x	x	x	x	x		x	x	x	x	
Pale Chanting Goshawk	<i>Melierax canorus</i>	54,43	14,86	-	-	x	H	x	x	x	x	x		x	x	x	x	
Secretarybird	<i>Sagittarius serpentarius</i>	2,53	0,00	EN	VU		L	x	x		x			x	x	x		x
Southern Black Korhaan	<i>Afrotis afra</i>	0,00	0,45	VU	VU		L	x						x	x	x		x
Spotted Eagle-Owl	<i>Bubo africanus</i>	6,33	1,80	-	-		M	x		x	x	x	x	x	x	x	x	
Verreaux's Eagle	<i>Aquila verreauxii</i>	2,53	1,35	-	VU		L	x	x		x	x		x	x		x	

8.9.1 Transects

The results of the transect counts are tabled in the tables below:

Table 14: The result of the drive transects.

DRIVE TRANSECTS			
	Total number of records - all species	Total number of species	Total number of wind priority species
Wind farm	1452	78	2
Control site	1079	77	2

Table 15: The result of the walk transects.

WALK TRANSECTS			
	Total number of records - all species	Total number of species	Total number of wind priority species
Wind farm	641	78	2
Control site	401	77	2

An Index of Kilometric Abundance (IKA = birds/km) was calculated for each priority species recorded during transects over all four seasons (refer to Figures below).

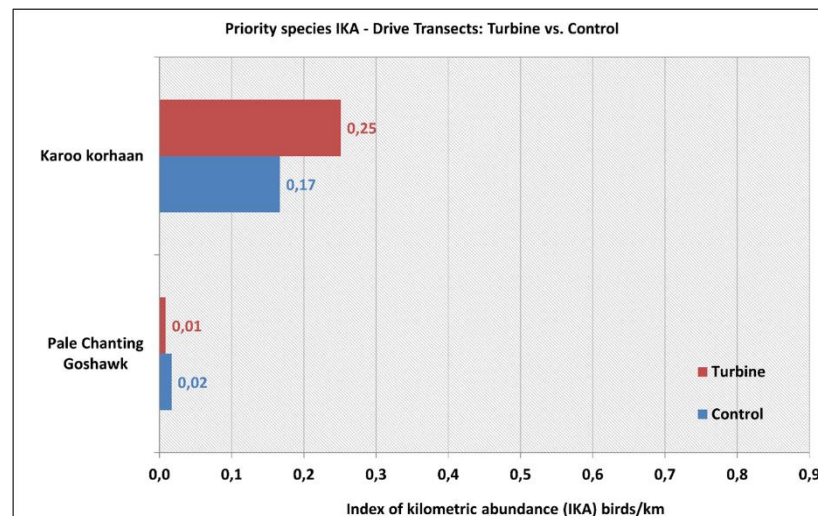


Figure 30: Index of kilometric abundance of priority species recorded at the WEF and control site with drive transect surveys across four seasons.

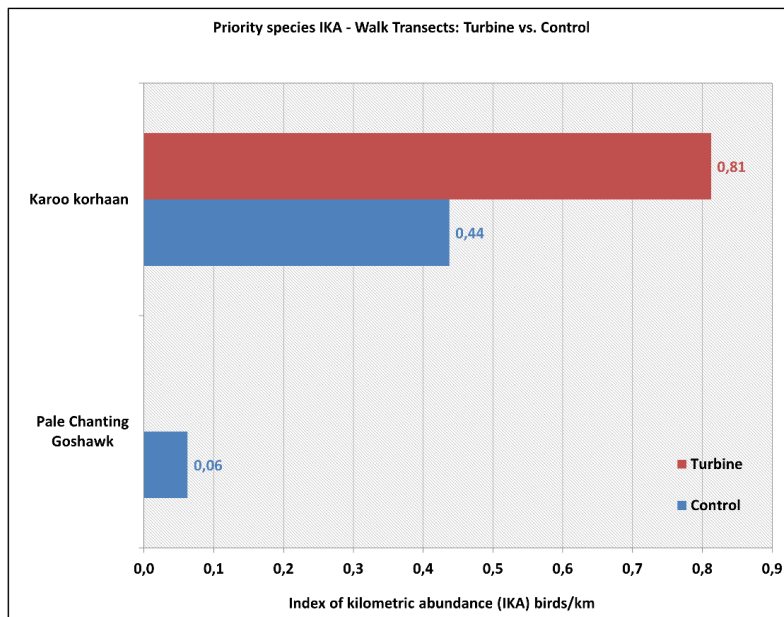


Figure 31: Index of kilometric abundance of priority species recorded at the WEF and control site with walk transect surveys across four seasons.

Figure below shows the spatial distribution of the priority species recorded during transect counts and incidental sightings across all four seasons.

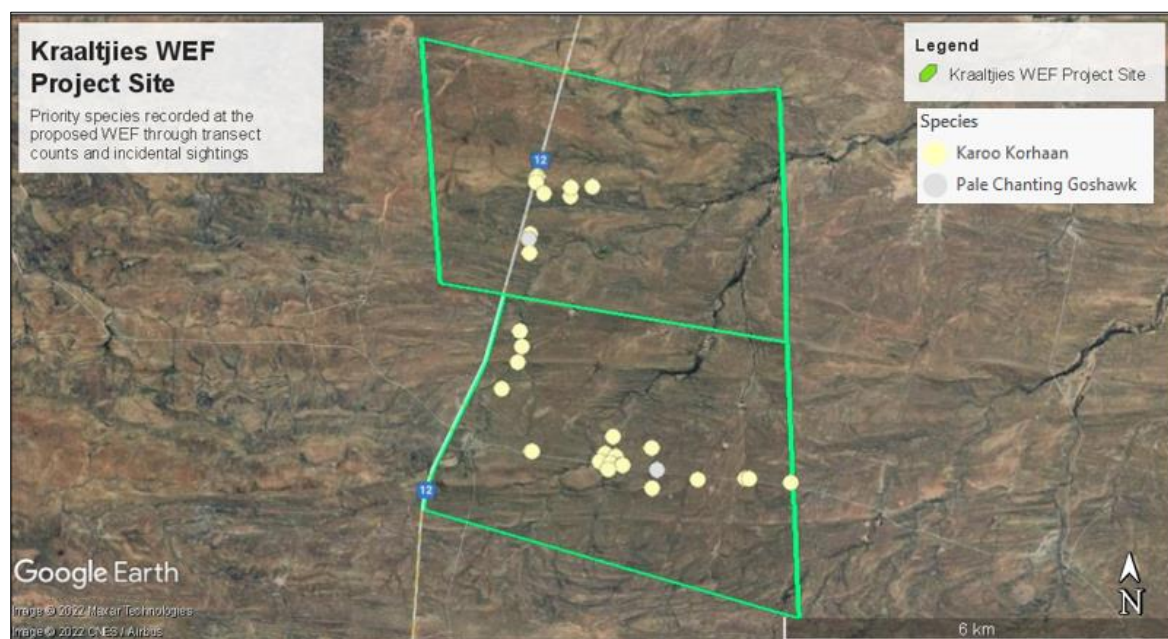


Figure 32: The location of priority species recorded at the proposed WEF through transect counts and incidental sightings

8.9.2 Focal points

A total of two potential Focal Points (FPs) of bird activity, i.e., earth dams, were identified and monitored at the turbine site during four seasons of monitoring. A Martial Eagle nest located on Tower 108 of the Droërivier-Proteus 1400kV transmission line was also chosen as a Focal Point and monitored. The Martial Eagle nest is located approximately 5km from the application site.

The following species were recorded at the focal points:

Table 16: Species observed at the Focal Points during four seasons of monitoring.

Date	Focal Point	Description	Species	No	Comments
SPRING August/September 2020	FP1	Martial Eagle nest on Tower 108	Martial Eagle		No birds were recorded in the area.
	FP2	Earth dam	South African Shelduck Red-billed Teal Pied Avocet Egyptian Goose Three-banded Plover South African Shelduck Egyptian Goose Pied Avocet Three-banded Plover	2 2 4 2 2 2 1 5 2	Dam was about 5% full.
SUMMER December 2020	FP1	Martial Eagle nest on Tower 108	Martial Eagle	-	No birds were recorded in the area.
	FP2	Earth dam	-	-	Dam was completely dry. No birds were recorded.
AUTUMN March 2021	FP1	Martial Eagle nest on Tower 108	Martial Eagle		No birds were recorded in the area.
	FP2	Earth dam	-		Dam was completely dry. No birds were recorded.
WINTER June 2021	FP1	Martial Eagle nest on Tower 108	Martial Eagle	1	Martial Eagle observed perched on the tower above nest
	FP2	Earth dam	Three-banded Plover Pied Avocet Little Grebe Cape Wagtail Kittlitz's Plover Egyptian Goose	6 10 5 4 8 2	Dam about 55% full.

Figure 33 below indicates the proposed turbine and control areas where monitoring took place.

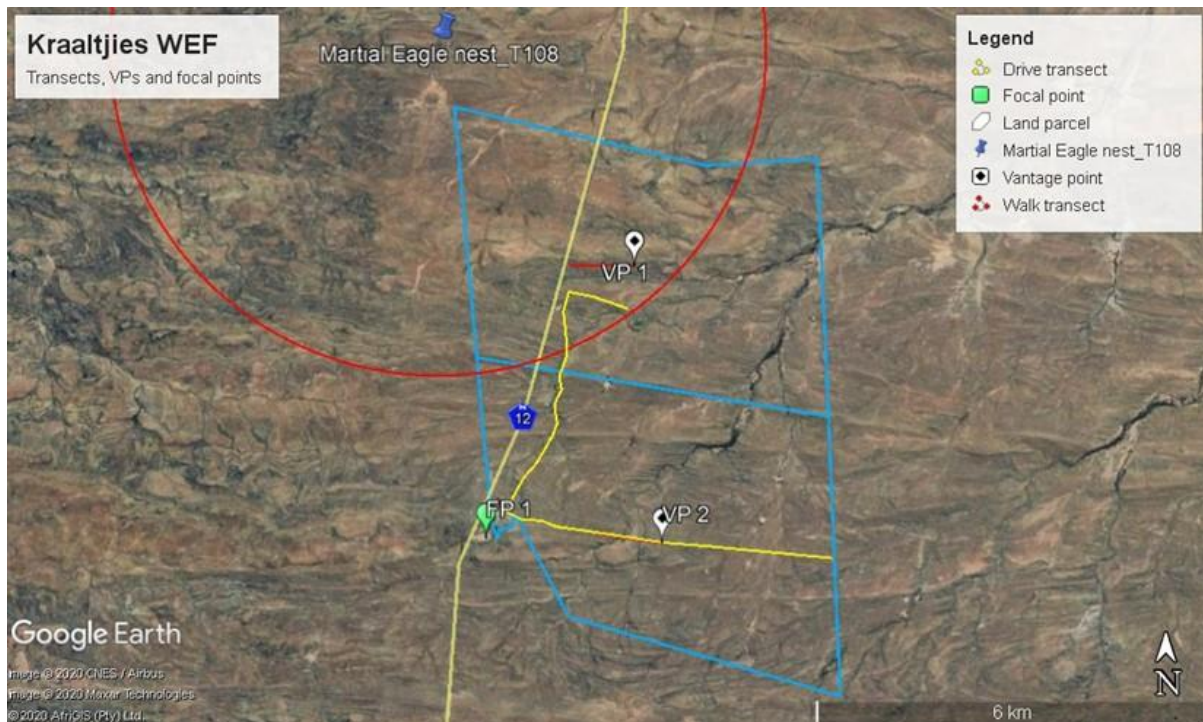


Figure 33: Area where monitoring is taking place, with position of VPs, focal points, drive transects, walk transects and WEF application site (blue polygons). The control area is to the west of the proposed WEF site.

8.9.3 Vantage point observations

A total of 96 hours of vantage point watches were completed at two vantage points within the WEF application site in order to record flight patterns of priority species. For the four sampling periods, the duration of priority species flights amounted to 21 minutes and 30 seconds with 13 minutes being at wind turbine rotor altitude (i.e., medium height flights). A total of 17 individual flights were recorded.

The passage rate for priority species was 0.17 birds/hour, which is the 15th lowest passage rate measured for the 66 instances where we did a year vantage point watches at a project site. This amounts to approximately 2.3 birds per day.

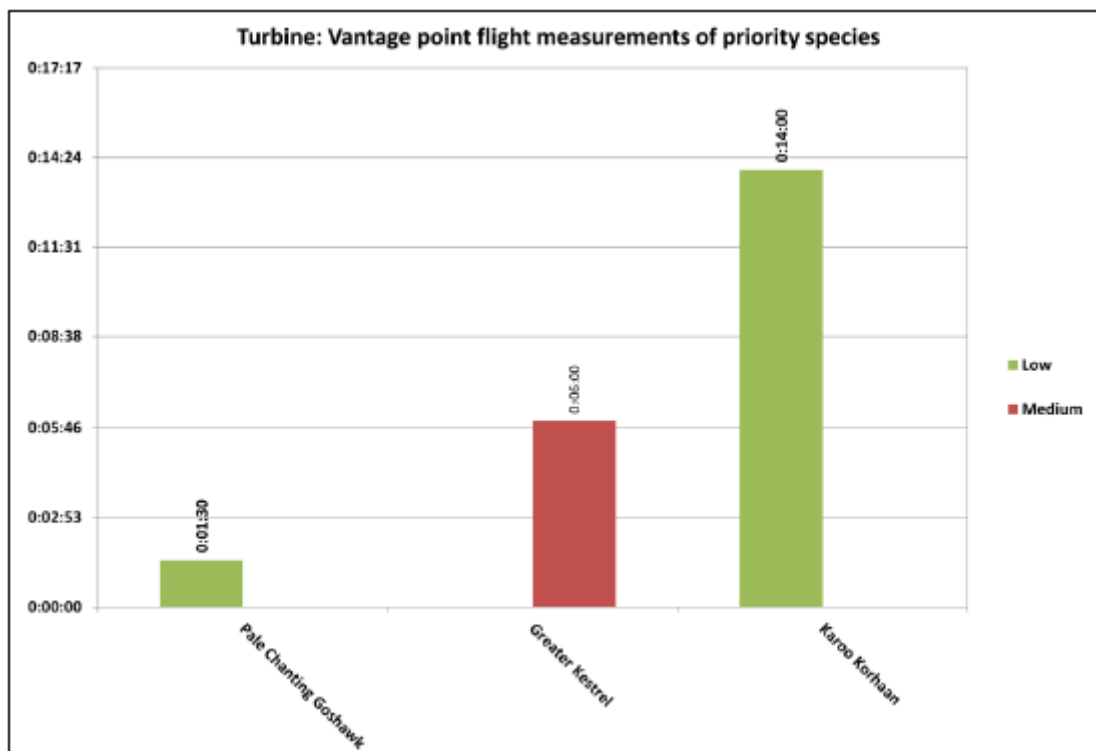


Figure 34: Flight times and altitude recorded for priority species.

8.9.4 Site specific collision risk rating

A site-specific collision risk rating for each priority species recorded during VP watches was calculated to give an indication of the likelihood of an individual of the specific species to collide with the turbines at these sites. This was calculated taking into account the following factors:

- The duration of flights;
- The susceptibility to collisions, based on morphology (size) and behaviour (soaring, predatory, ranging behaviour, flocking behaviour, night flying, aerial display and habitat preference) using the ratings for priority species in the Avian Wind Farm Sensitivity Map of South Africa (Retief et al. 2012); and
- The number of turbines.

This was done in order to gain some understanding of which species are likely to be most at risk of collision. The formula used is as follows:

Duration of flights (in decimal hours) x collision ratings in the Avian Wind Farm Sensitivity Map x number of turbines ÷ 100.

The results are presented in **Table 17** and **Figure 35** below.

Table 17: Site specific collision risk rating

Species	Duration of all flights (hr)	Avian Wind Farm Sensitivity Map collision susceptibility rating	Site specific collision risk rating
Pale Chanting Goshawk	0.001	70	0.01
Greater Kestrel	0.004	57	0.05
Karoo Korhaan	0.010	65	0.13

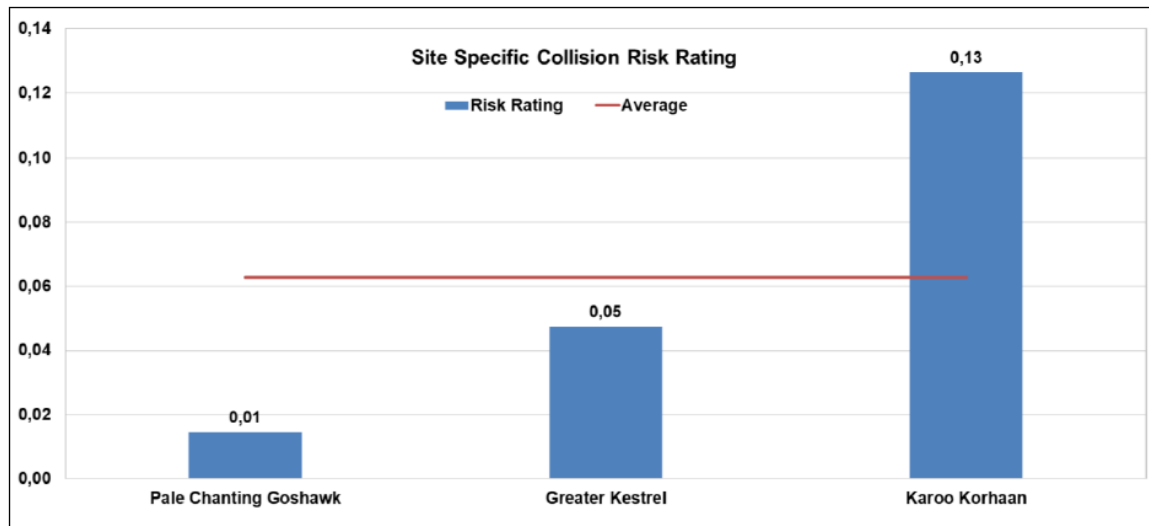


Figure 35: Site specific collision risk rating for priority species. The red line indicates the average collision risk rating for priority species at the application site, based on recorded flight behaviour in four seasonal surveys.

8.9.5 Spatial distribution of flights over the turbine area

Flight maps were prepared for the species with higher than zero collision risk indices, indicating the spatial distribution of flights observed from the various vantage points. This was done by overlaying a 100m x 100m grid over the survey area. Each grid cell was then given a weighting score (Very High; High; Medium; Low) taking into account the flight intensity i.e. the duration and distance of individual flight lines through a grid cell and the number of individual birds associated with each flight crossing the grid cell, in order to give an indication where the observed flight activity was most concentrated (see **Figure 36, Figure 37 and Figure 38**).



Figure 36: Intensity of flight activity of Greater Kestrel across four seasons of monitoring



Figure 37: Intensity of flight activity of Karoo Korhaan over four seasons of monitoring



Figure 38: Intensity of flight activity of Pale Chanting Goshawk over four seasons of monitoring

8.9.6 The identification of environmental sensitivities

The following environmental sensitivities were identified from an avifaunal perspective for the proposed wind energy facility:

High sensitivity No-turbine buffer: Surface Water

Included in this category are areas within 200m of water troughs and earth dams, and 150m from all major drainage lines. Surface water in this arid habitat is crucially important for priority avifauna, including several Red Data species such as Martial Eagle, Lanner Falcon and Secretarybird, and many non-priority species, including several waterbirds. Drainage lines, when flowing, attract waterbirds on occasion, as do the large pools that remain in the channel after the flow has stopped. Wind turbines that are placed near these sources of surface water pose a collision risk to birds using the water for drinking and bathing, and drainage lines, when flowing, are natural flight paths for birds.

High sensitivity No-turbine buffer: Breeding Red Data Species nests

Transmission lines are an important breeding substrate for raptors in the Karoo, due to the lack of large trees (Jenkins *et al.* 2013). A Martial Eagle nest is present on Tower 108 of the Droërvier Proteus 1400kV transmission line, 5km from the closest proposed turbine location, and approximately 1km from the closest border of the proposed application site. In May 2020, both adult birds were observed perching on the towers around the nest, indicating that the territory is active. A 5km No-turbine buffer zone must be implemented around the nest to reduce the risk of turbine collisions.

Verreaux's Eagle was only identified as a species that could potentially occur in the broader area. In addition, this species was noted as having a Low likelihood of regular occurrence at the site. No specific sightings were made of the species, nor were any nests identified. As such, the applicability of the VERA model and associated buffer zones are not deemed appropriate as no known nests occur in proximity to the wind farm.

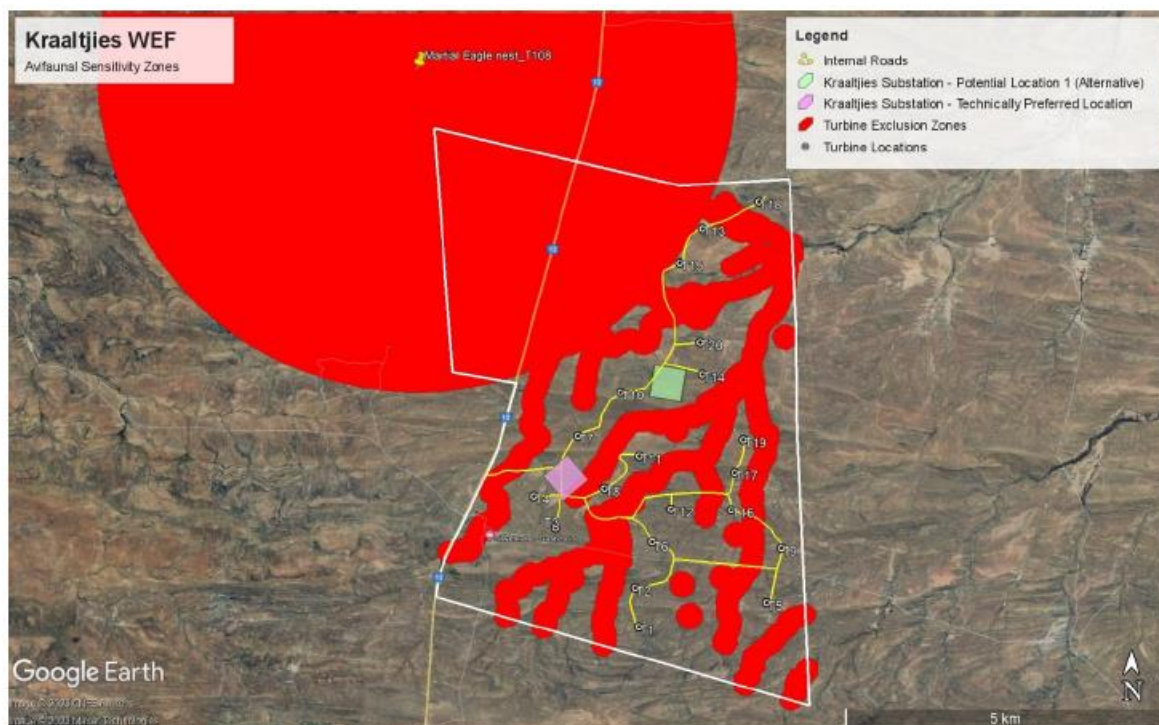


Figure 39: Proposed no-turbine zones. Other infrastructure is allowed.

8.10 Bat

A bat specialist study was undertaken by EkoVler (May 2023).

Bats are adversely affected by the wind turbines that encroach on air space where they forage and commute. The bats identified have distribution ranges that include the Kraaltjies 240MW Wind Energy Facility development site. Bat presence confirmed on the site itself, or other wind farms in the area, are marked as such. The proposed WEF is located within the distribution range of six families and approximately 12 species. The below table is informed by the most recent distribution maps of Monadjem et al. (2010).

Of the 12 species which have distribution maps overlaying the proposed development area, four have a conservation status of Near Threatened in South Africa and one Vulnerable, while three have a global conservation status of Near Threatened. *Eptesicus hottentotus* (the Long-tailed serotine), *Cistugo seabrae* (the Angolan wing-gland bat) and *Rhinolophus capensis* (Cape horseshoe bat) are endemic to Southern Africa and have limited suitable habitat left, mainly due to agricultural activities (Monadjem, et al., 2020).

According to the likelihood of fatality risk, as indicated by the latest pre-construction guidelines (MacEwan, 2020) four species, namely *Miniopterus natalensis* (Natal long-fingered bat), *T. aegyptiaca* (Egyptian free-tailed), *S. petrophilus* (Roberts's flat-headed bat) and *N. capensis* (Cape serotine) have a high risk of fatality. The high risk of fatality for *T. aegyptiaca* and *S. petrophilus* is due to their foraging habitat at high altitudes, while *N. capensis*, though known as a clutter-edge forager, tends to forage at various altitudes, including within the sweep of turbine blades. *Myotis tricolor* (Temminck's myotis bat) has a medium to high risk of fatality while *E. hottentotus* has a medium risk of fatality. The two

Pteropodidae species, with a medium to high risk of fatality, are not expected to roost on the Kraaltjies WEF development, as this environment is not expected to be their preferred habitat; however, they could traverse over the project site during migration and are therefore included.

Table 18: Potential bat species occurrence at the proposed Kraaltjies WEF site. Highlighted yellow cells indicate confirmed presence at the development site. Information about the species is from Monadjem, et al. 2010 and 2020.

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed in vicinity
PTEROPODIDAE	<i>Eidolon helvum</i>	African straw-coloured fruit bat	Not evaluated	Least Concern	Little known about roosting behaviour	Broad wings adapted for clutter. Studies outside of South Africa list fruit and flowers in diet	Migrater. Recorded migration up to 2 518 km in 149 days, and 370 km in one night	Medium-High	
	<i>Rousettus aegyptiacus</i>	Egyptian rousette	Least Concern	Least Concern	Caves	Broad wings adapted for clutter. Fruit, known for eating ficus species	Seasonal migration up to 500 km recorded. Daily migration of 24 km recorded	Medium-High	
MINIOPTERIDAE	<i>Miniopterus natalensis</i>	Natal long-fingered bat	Near Threatened	Near Threatened	Caves	Clutter-edge, insectivorous	Seasonal, up to 150 km	Medium-High	✓
NYCTERIDAE	<i>**Nycteris thebaica</i>	Egyptian flit-faced bat	Least Concern	Least Concern	Cave, aardvark burrows, road culverts, hollow trees; known to make use of night roosts	Clutter, insectivorous, avoids open grassland, but may be found in drainage lines	Not known	Low	✓
MOLISSIDAE	<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat	Least Concern	Least Concern	Roofs of houses, caves, rock crevices, under exfoliating rocks, hollow trees	Open-air, insectivorous	Not known	High	✓
	<i>Sauromys petrophilus</i>	Robert's Flat-faced	Least Concern	Least Concern	Narrow cracks, under exfoliating of rocks, crevices	Open-air, insectivorous		High	✓
RHINOLOPHIDAE	<i>Rhinolophus capensis</i>	Cape horseshoe bat (endemic)	Near Threatened	Near Threatened	Night roosts in caves and old mines	Clutter, insectivorous	Not known	Low	

Family	Species	Common Name	SA conservation status	Global conservation status (IUCN)	Roosting habitat	Functional group (type of forager)	Migratory behaviour	Likelihood of fatality risk*	Bats confirmed in vicinity
	<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	Near Threatened	Least Concern	Night roosts in caves and old mines	Clutter, insectivorous		Low	
VESPERTILIONIDAE	<i>Neoromicia capensis</i>	Cape serotine	Least Concern	Least Concern	Roofs of houses, under bark of trees, at basis of aloes	Clutter-edge, insectivorous	Not known	Medium-High	✓
	<i>Myotis tricolor</i>	Temminck's myotis	Near Threatened	Least Concern	Roosts in caves, but also in crevices in rock faces, culverts, and manmade hollows	Limited information available	Not known	Medium-High	
	<i>Eptesicus hottentotus</i>	Long-tailed serotine (endemic)	Least Concern	Least Concern	Caves, rock crevices, rocky outcrops	Clutter-edge, insectivorous	Not known	Medium	✓
	<i>Cistugo seabrae</i>	Angolan wing-gland bat (endemic)	Vulnerable	Near Threatened	Possibly buildings, but no further information	Clutter-edge, insectivorous	Not known	Low	

8.10.1 Features conducive to Bats at the WEF

Bats are dependent on suitable roosting sites provided mainly by human structures, vegetation, exfoliating rock, rocky outcrops, derelict mine and aardvark holes and caves (Monadjem et al., 2020). The foraging utility of a site is further determined by water availability and availability of food. Thus, the vegetation, geomorphology and geology of an area are important predictors of bat species diversity and activity levels.

Vegetation

Although most of the site is covered in Gamka Karoo vegetation typical of the area, trees situated in the non-perennial riverbeds could provide roosting opportunities for bats that prefer roosting in vegetation or under the bark of trees.



Figure 40: Relatively dense vegetation along the dry riverbeds

Rock formations and rock faces

Rocky outcrops and rock formations along the ridge lines and along river valleys could provide roosting opportunities for bats.



Figure 41: Rock formations along the hill tops



Figure 42: Animal burrows or possible aardvark holes that could provide roosting opportunities for bats.

Human Dwellings

Where roofs are not sealed off, human dwellings could provide roosting space for some bat species. Evidence of bats were found in more than one of the farm buildings situated within the borders of the Kraaltjies WEF site. Bat droppings were seen at farm dwellings. Although no roosting activities were found at culverts and stone walls situated on Kraaltjies, these could also provide roosting opportunities.



Figure 43: Signs of bat roosts at the farm dwelling at Silwer Karoo



Figure 44: Possible roosting structures



Figure 45: Stone walls at the farmhouse providing roosting opportunities for bats.

Open water sources

Water troughs for the livestock and open dams and cement reservoirs provide permanent, open water sources for bats throughout the year. In the dry Nama-Karoo environment, these manmade water resources play an important role in bat activity on site. Two relatively large rivers with Karoo riverine vegetation, the Amos- and the Dou rivers, occur in the eastern and northeastern sections of the proposed WEF. Although these are non-perennial rivers, water collects in the riverbeds during rainy spells. The potential attraction of insects together with ample vegetation cover, provide ideal flight corridors and roosting opportunities for bats, especially those species that prefer to forage amongst vegetation.



Figure 46: Permanent, open water source

Food Sources

During the few spells of rain, stagnant water that usually collects in small pans and dry ditches could serve as breeding grounds for insects which could serve as food for bats. High insect activity results in higher bat presence after sporadic rainy periods. Livestock also attracts flies, which in turn could serve as a food source for bats.

8.10.2 Transects

Transects are a snapshot in time however the data from this sampling assist confirm species present at the site. The transect route, with the stationary monitoring points. A SM4 GPS was linked to the detectors so that the route is recorded while driving. The detector was calibrated each time at the start of the transect. A transect was conducted during November 2021, under optimal weather conditions, but no bats were recorded during the transect.

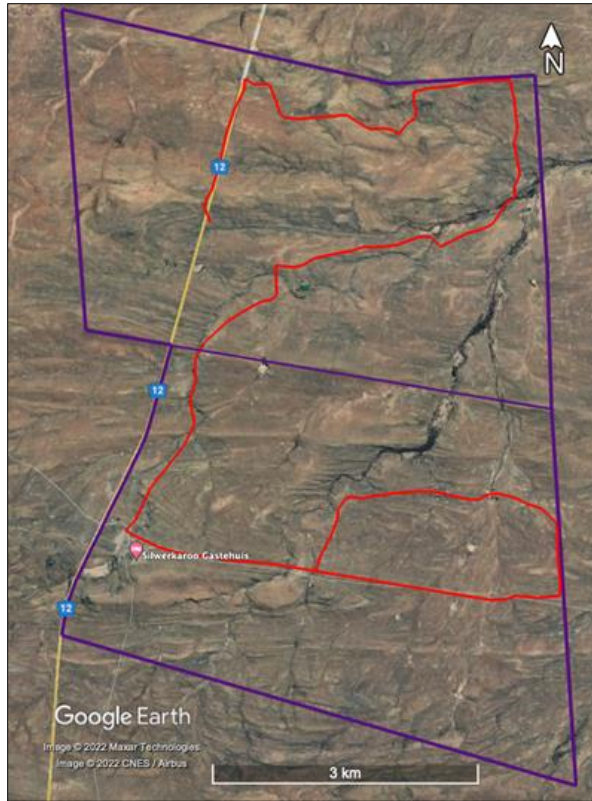


Figure 47: Transect route

8.10.3 Bat Sensitivity

Sensitivity zones are based on buffer zones, as indicated by the South African Good Practice Guidelines for Surveying Bats at Wind Energy Facility Developments – Pre-construction (MacEwan, et al. 2020). These zones are refined through field visits and physically visiting the bat-conducive environments occurring at the development sites, as well as static and active monitoring data.

The minimum buffer recommendation from SABAA is a 200 m buffer around all potentially bat-important features. **Figure 48** has therefore incorporated 200 m buffers as a minimum.

Although no turbines at Kraaltjies WEF is situated in sensitivity zones, it should be mentioned that sensitivity zones are relevant to all components of the turbines, including the tips of the turbine blades; therefore, should a turbine be installed within proximity to a medium sensitivity zone, with the turbine tip within the sensitivity zone, then the mitigation of the medium zone should be applied to that turbine.

In cases of high bat sensitivity zones, it is recommended that these areas constitute 'no-go' development areas, i.e., where turning turbine components are not allowed, whereas medium sensitivity zones could be developed (turbines and associated infrastructure), but with mitigation. No medium zones have been identified at the terrain.

High sensitivity Zones

High sensitivity zones are areas which should be avoided at all costs. This applies to placing turbine positions, but as far as possible also for laydown areas and other supporting infrastructure, with the exception of roads and overhead powerlines. 'No-go' zones for turbine placement are recommended for the following:

- Hilly areas with rock formations and rocky ridges;
- Dry riverbeds with historical riparian shrub;
- Clumps of trees;
- Any other features conducive to bat roosts:
- 500 m buffer around human dwellings; and
- 200 m buffer around water sources, including water troughs for livestock, reservoirs, dams, and some clumps of isolated trees. Some of these features could be historic, and might not present riparian shrub at present, but the precautionary principle is valid for periods with increased rainfall, as per the bat guidelines.

Medium sensitivity Zones

Medium zones are areas that could be considered for development, but with mitigation. The developer has already mitigated medium sensitivity zones through adapting the buildable area careful placement of turbines so that no development occurs in medium sensitivity zones.

Low sensitivity Zones

According to the SABAA (MacEwan, 2020) threshold for Nama Karoo the bat activity within the sweep of the turbine blades is medium, but high near the ground for the Kraaltjies WEF site. There is a clear spike in activity during autumn, indicating a possible migration route of *M. natalensis*. However, until there is clarity on this aspect, no mitigation is recommended for low-sensitivity areas and these areas can be developed without turbine-specific mitigation at this stage of the project.

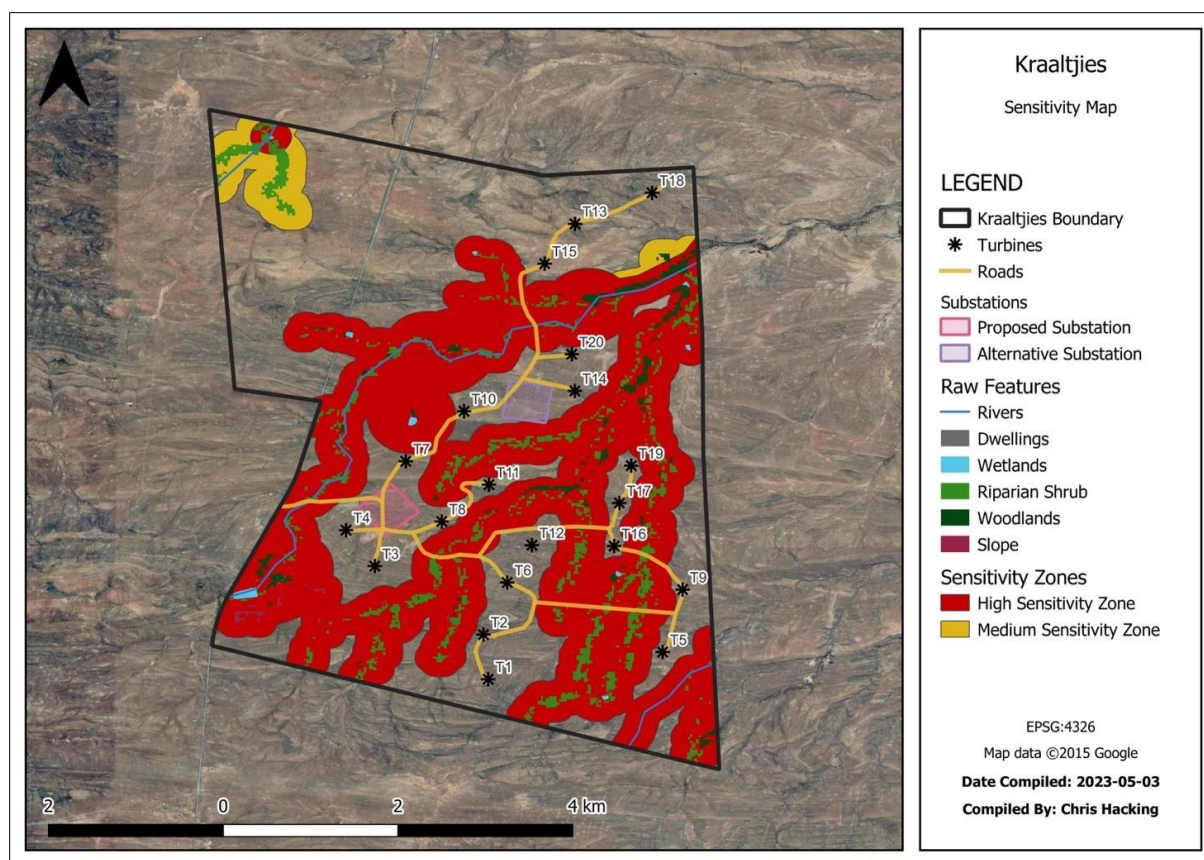


Figure 49: The bat sensitivity map for the proposed Kraaltjies WEF site

9. DESCRIPTION OF THE SOCIO- ECONOMIC ENVIRONMENT

9.1 Socio economic characteristics

9.1.1 Western Cape Province

The Western Cape is located on the southern tip of the African continent between the Indian and Atlantic Oceans. It is bordered by the Northern Cape and Eastern Cape provinces. The Western Cape's natural beauty makes the province one of the world's greatest tourist attractions. The region is topographically and climatically diverse. It has a temperate southern coastline fringed with mountains. To the north it stretches deep into the Karoo plateau, while the west coast is extremely dry.

It covers an area of 129 462km² and has a population of 6 279 730. It is the fourth-largest province in South Africa by surface area and also ranks fourth in population. The capital is Cape Town. Other major cities and towns include George, Knysna, Paarl, Swellendam, Oudtshoorn, Stellenbosch, Worcester, Mossel Bay and Strand.

The Western Cape is rich in agriculture and fisheries. The climate of the peninsula and the mountainous region beyond it is ideal for grape cultivation, with a number of vineyards producing excellent wines. Other fruit and vegetables are also grown here, and wheat is an important crop to the north and east of Cape Town. Fishing is the most important industry along the west coast and sheep farming is the mainstay of the Karoo. The province has a well-established industrial and business base, and the lowest unemployment rate in the country. Sectors such as finance, real estate, ICT, retail and tourism have shown substantial growth, and are the main contributors to the regional economy. Many of South Africa's major insurance companies and banks are based in the Western Cape. The majority of the country's petroleum companies, and the largest segment of the printing and publishing industry are located in Cape Town.

The Western Cape is divided into one metropolitan municipality (City of Cape Town Metropolitan Municipality) and five district municipalities, which are further subdivided into 24 local municipalities (refer to **Figure 35**).

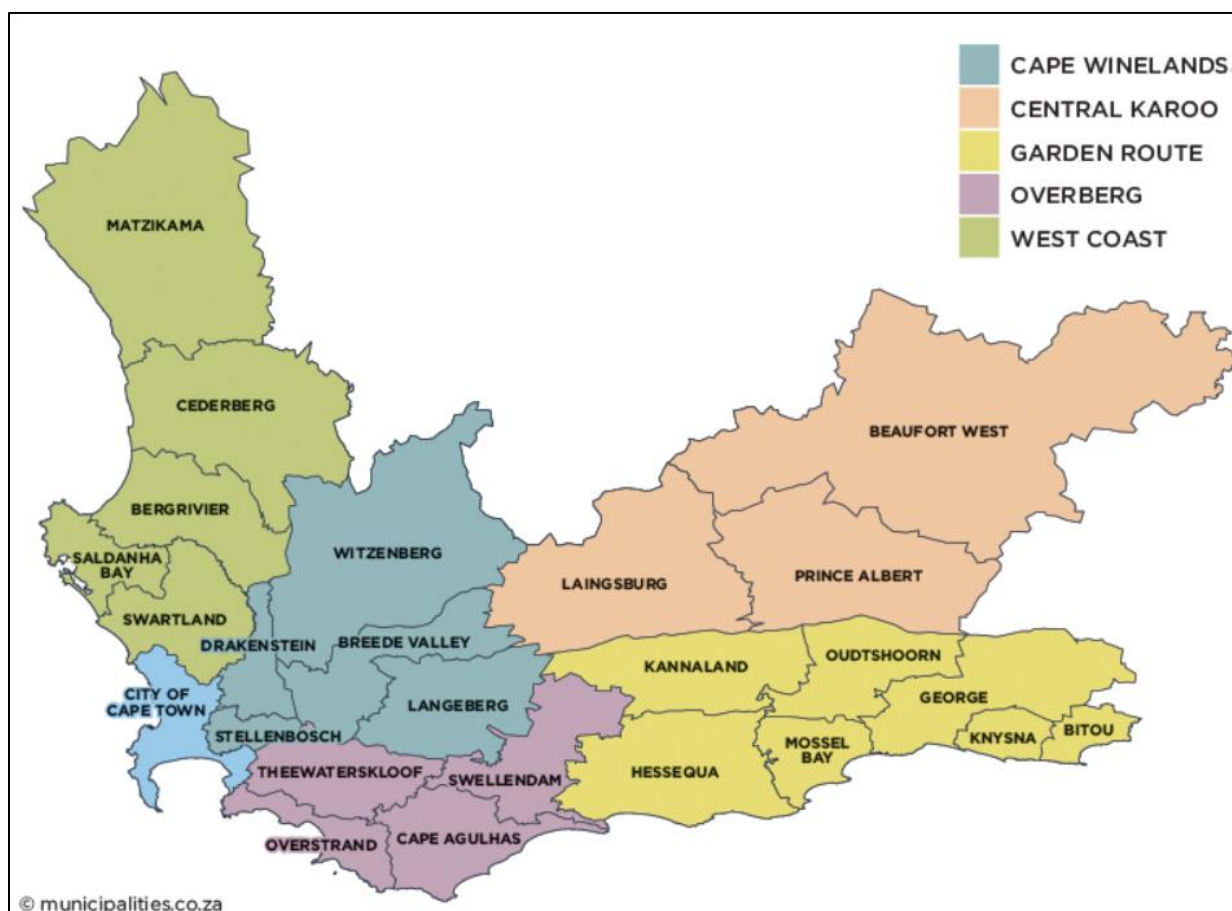


Figure 50: Map showing the District Municipalities of the Western Cape Province

(Source: www.municipalities.co.za)

9.1.2 Central Karoo District Municipality

Central Karoo District Municipality is a Category C municipality located in the Western Cape Province. It is bordered by the Pixley Ka Seme District Municipality in the north, Namakwa District Municipality in the north-west, Garden Route District Municipality in the south, Sarah Baartman District Municipality in the east and Cape Winelands District Municipality in the west. The Central Karoo is the largest district in the province, making up a third of its geographical area and covering an area of 39 073.1 km² in 2016. It is comprised of three local municipalities: Laingsburg, Prince Albert and Beaufort West. Other major cities and towns include Beaufort West, Murraysburg, Merweville, Prince Albert and Laingsburg.

The main economic sectors of the district include agriculture (47%), some of the main economic sector include finance and business (22%), Community services (19%) and construction (7%). With a population of 74 247 people, the Central Karoo district has a population density of 1.9/km². According to the Community Survey, 2016; the district has a sex ratio of 93.8 with 25.4% of the population being under 15 years; 67.4% being between 15 and 65 years and 7.2% being over 65 years of age.

9.1.3 Beaufort West Local Municipality

The project site is located within the Beaufort West Local Municipality. The Beaufort West Local Municipality is a Category B municipality within the Central Karoo District. It is bordered by the Northern Cape to the north and west, Prince Albert to the south, and the Eastern Cape to the east. It is the largest municipality of three in the district, making up more than half its geographical area. Beaufort West is the oldest municipality in South Africa. The new district was proclaimed on 27 November 1818. The then governor of the Cape, Lord Charles Somerset, named the town and district 'Beaufort' in honour of his father, the 5th Duke of Beaufort. To avoid confusion with Fort Beaufort and Port Beaufort, the name 'Beaufort' was changed to Beaufort West in the 1860s. In December 1994, the former black township Kwa-Mandlenkosi was amalgamated with Beaufort West Municipality. In December 2000, the rural towns of Merweville and Nelspoort were also incorporated as part of the Beaufort West Municipality.

The Beaufort West municipality area currently has a population of 51 074. This total is expected to decrease to 50904 by 2024, equating to an average annual growth rate of 0.1 percent, in comparison to the other municipalities in the area. The main economic sectors of the municipality include Community services (29.1%), transport (17.0%), trade (14.0%), finance (13.5%)

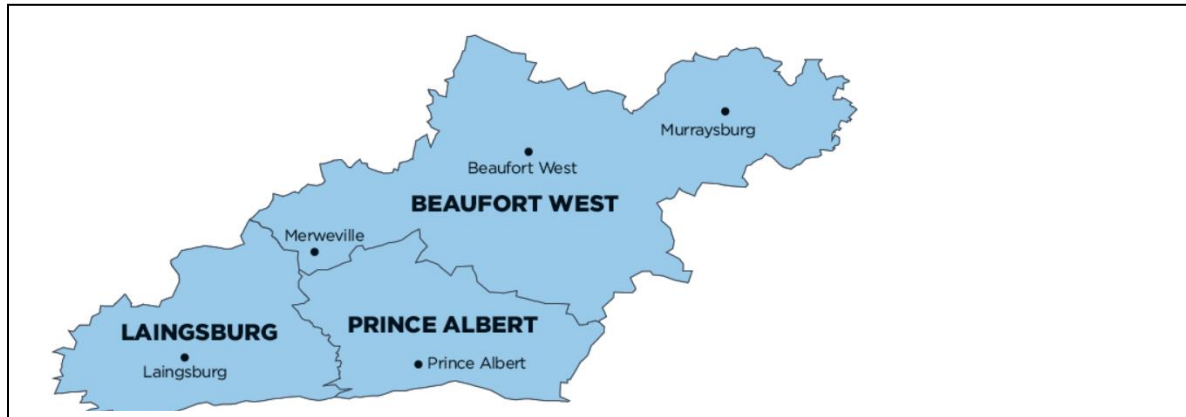


Figure 51: Map showing the Prince Albert Local Municipality of the Waterberg DM

(Source: www.municipalities.co.za)

9.2 Cultural/Historical Environment

A Heritage Impact Assessment was undertaken by PGS Heritage (report dated August 2023).

9.2.1 Archaeological

Historical topographic maps (1:50 000) for various years (1965, 1987, 2005) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

There were several structures identified within the vicinity of the proposed development area. Most of the structures were identified as farmsteads.

It is well known that the Karoo contains a long and rich archaeological record dating from the ESA to the historic period. However, vast areas of the region have yet to be subjected to systematic analytical research.

Scatters of ESA through to LSA artefacts have been widely reported in the general vicinity of Beaufort West. This is a result of the erosional nature of the environment, which tends to leave artefacts exposed on the surface rather than buried beneath layers of sediment. To date, heritage studies in the area have shown that these artefacts have occurred in secondary contexts, often associated with gravel deposits, having been subjected to erosion of the soils in which they were once deposited (Dreyer 2005; Halkett 2009; Kaplan 2006, 2007; Orton 2010; Webley & Hart 2010a, 2010b; Webley & Lanham 2011). Although context is generally poor, the Karoo is still regarded as a region that is very rich in archaeological and historical heritage.

Historical resources, such as farmsteads, kraals and graves, are also observed within the Beaufort West region (Halkett 2009; Webley & Hart 2010b). To the northeast of Beaufort West, rock engravings have been

identified on dolerite boulders that are characteristic of parts of the Karoo (Orton, 2010; Parkington *et al.*, 2008). The lack of caves and rock shelters in the Karoo region, results in the majority of archaeological sites in the area being classified as open-air sites. As such, the artefacts are generally not *in-situ* and organic remains are rarely preserved.

The evaluation of satellite imagery and the analysis of the studies previously undertaken in the area has indicated that certain areas may be sensitive from a heritage perspective. Archaeological surveys and studies in the area have shown rocky outcrops, dry riverbeds, riverbanks and confluence to be prime localities for archaeological finds and specifically Stone Age sites (Kinahan, 2008; Halkett, 2009; Webley & Halkett, 2015).

The analysis of the studies conducted in the area assisted in the development of the following landform to heritage find matrix in **Table 19**. Dry river courses have been referenced as having possible heritage sensitivity within the study area (**Figure 52**). It must be noted that the proposed development layout for the most part has excluded river courses from the footprint. It must be noted that the proposed development layout for the most part has excluded river courses from the footprint.

Table 19: Landform type to heritage find matrix

LAND FORM TYPE	HERITAGE TYPE
Crest and foot hill	MSA scatters
Pans/ dry river courses	LSA/MSA scatters
Outcrops	Occupation sites dating to LSA
Farmsteads	Historical archaeological material

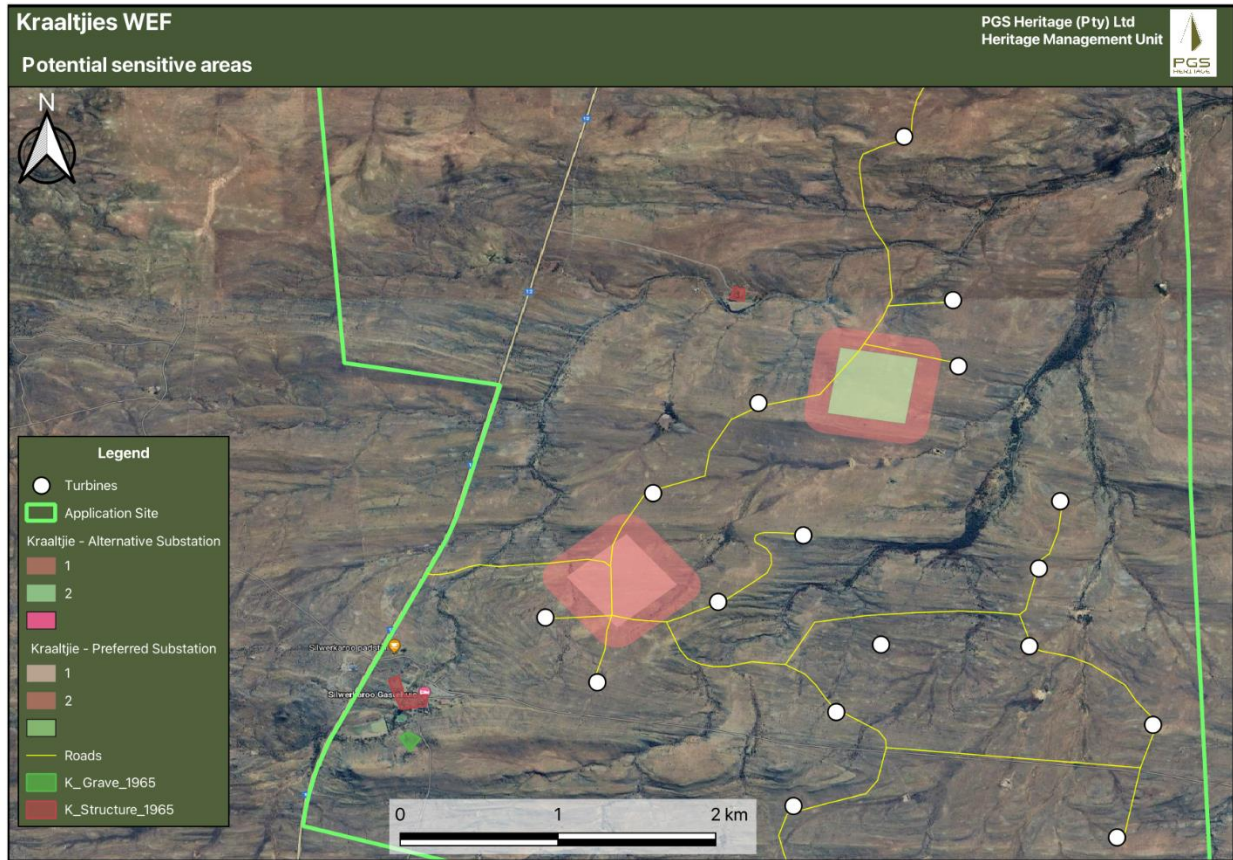


Figure 52: Possible heritage sensitivity areas; Farmstead (red polygon) and graves (green polygon) within the Kraaltjies WEF study area.

A selective survey of the study area was conducted in February 2021. Due to the nature of cultural remains, with the majority of artefacts occurring below surface, two archaeologists from PGS conducted a vehicle and foot-survey of the proposed development area. The fieldwork was logged with GPS devices to provide a tracklog of the area covered.

The fieldwork identified 44 heritage finds that were then classified as either find spots, structures (incl. historical farmsteads), burial grounds and graves or possible grave sites.

Burial Grounds and graves

Two (2) burial grounds (**K027**, **KC001**) were rated as having high heritage significance.

Historical structures

The farmstead at **KC001** was rated as having high heritage significance. Four (4) structures (**K012(K012/1, K012/2, K012/3, K012/4)**) were rated as having medium heritage significance and three (3) structures (**K026 (K026/1), K036**) were rated as having low heritage significance.

Archaeological features

Three (3) Stone Age sites (**K022, K033, K039**) were rated as having medium heritage significance and two (2) Stone Age sites (**K001, K003**) were rated as having low heritage significance.

Twenty-nine (29) find spots (**K002, K004-5, K007-8, K010-11, K013-21, K023-25, K028-32, K034-35, K038, K040**) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the Middle Stone Age (MSA), although both Later Stone Age (LSA) and earlier Early Stone Age (ESA) material was identified. All of these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.

9.2.2 Palaeontological

The proposed Kraaltjies WEF and associated Infrastructure project area is underlain by continental (fluvial/lacustrine) sediments of the Abrahamskraal Formation and lowermost Teekloof Formation (Lower Beaufort Group, Karoo Supergroup) which are of late Middle Permian age. These bedrocks contain sparse, unpredictable to locally concentrated vertebrate fossils as well as rare trace fossils (e.g., tetrapod trackways and burrows, lungfish burrows) and plant material of scientific and conservation value.

The main geological features of this region of the Great Karoo margins have already been covered in some detail in the previous accounts of the adjoining Trakas and Beaufort West WEFs by Almond (2018, 2022d, 2022e) and will therefore not be repeated at length here. Selected examples of key geological features within the Kraaltjies WEF project area are illustrated below (**Figure 53 to Figure 54**), with explanatory figure legends.



Figure 53: Erosive-based channel sandstone body of the Abrahamskraal Formation sharply overlying thin-bedded grey-green overbank mudrocks with a well-defined, intermittent horizon of substantial ferruginous carbonate concretions (arrowed), banks of the Dourivier on Farm Brits Eigendom No 374/25.



Figure 54: Weathering-out horizon of palaeocalcrete concretions marking an ancient soil horizon within grey-green overbank mudrocks, Abrahamskraal Formation on Farm Brits Eigendom No 374/25 (hammer = 30 cm).

According to the report, very few new fossil vertebrate sites - most notably a partial, articulated skeleton of a therocephalian carnivore - have been recorded within the WEF project area during the short (3.5 day) site visit, while several more sites have previously been mapped in the vicinity during recent palaeontological surveys of adjoining WEF project areas.

Only one small palaeontological Very High Sensitivity area – located towards the southern edge of Farm Brits Eigendom No 374/25 and characterized by in situ therapsid skeletal material and abundant fish remains. This High Sensitivity area lies outside the WEF and associated Infrastructure footprints. Since all known fossil sites can be readily mitigated – if necessary – through professional recording and collection of fossil material in the pre-construction phase, no recommendations for micro-siting of infrastructure such as wind turbine, pylon positions or access roads are therefore made here. There are no preferences on palaeontological heritage grounds for specific site options for the WEF on-site substation BESS, O&M buildings, guard house and construction laydown area, given their similar geological and palaeontological context.

9.2.3 Cultural Landscape

A Cultural Landscape Assessment was undertaken by Hearth Heritage as part of the Heritage Impact Assessment (July 2023). The cultural landscape is a composition of a series of natural layers that have both informed and been formed by the patterns of human use and habitation on that place over time. The nature and shape of the landscape has informed the way in which it has been used, in turn ascribing cultural values to these place-specific features. Through unpacking the layers, landscape character units can be identified which need to be carefully considered in proposed alterations to the landscape.

Cultural landscapes are a significant factor in the evaluation of the impact of proposed development on cultural heritage resources, tangible (e.g., Historic settlements, landscapes, technological) and intangible (e.g. language, indigenous knowledge systems, oral traditions). The area investigated for the proposed Kraaltjies WEF is considered as having a high cultural landscape heritage significance.

The Kraaltjies site can be divided into landscape character areas with cultural heritage resource types. These units were determined by taking the larger landscape context into consideration in order to understand the character and cultural heritage values that underpin the proposed development site.

9.2.3.1 Regional Cultural Landscape Elements

A description of the regional cultural landscape elements are as follows:

- “A magnificent natural setting” (Abrahamse, 2013) of arid plains with gently undulating ridges and koppies, framed by the dramatic mountain ranges of the Nieuweveld and Swartberg. This landscape element is the main drawcard for tourism to the area and a national narrative of identity for many South Africans. This scenic beauty and natural sense of place has been celebrated in no less than three national parks being proclaimed in the Koup region, the Karoo National Park, the Gamkapoort Nature Reserve and the Swartberg Nature Reserve, not to mention the various private nature reserves in the area.

- Some of the world's most significant geological and palaeontological sites are located in the Great Karoo, specifically between Beaufort West and Nelspoort, and include ancient rock formations and Late Permian fossils which record the evolution from reptiles to mammals.
- The distinct remoteness of the semi-arid Karoo provided a refuge for the displaced San and later the Khoekhoen. The remote settings of mission settlements are associated with the role of religion and an emphasis on social engineering and self-sufficiency (Winter and Oberholzer, 2014). This remote desert wilderness is an essential element to the Central Karoo cultural landscape's sense of place.
- Low shrubby vegetation dominates the landscape allowing for distant views of mountain ranges, with taller clusters of trees marking historic points such as cemeteries or farmsteads. Many of the endemic species hold medicinal value for local communities, making these significant as cultural resources.
- Although not immediately apparent on travelling through the landscape, significant stone age archaeology, which includes petroglyphs and rock engravings, is common in the area; material cultural remnants of the prehistoric inhabitants of the landscape who lived in intimate dependence on and knowledge of the natural environment, shaping it and being shaped by it over time. This relatively undisturbed area is rich in archaeology, especially near dolerite outcrops due to the presence of underground water and includes stone tool scatters, rock engravings and herder kraals.
- Poorts and drifts which navigate the topography of ridges and riverine corridors. These natural crossing points, gaps between the mountain ranges, ridges and undulating hills, and shallower sections of river, have been used by animals and people as the places to traverse the landscape to water, forage, safety or settlements for centuries. These places, acting as funnels of movements across the landscape, therefore, may hold the material scatter of those who passed over them and, where identified historic tracks are still used, these are heritage elements of land use and one of the ways in which the landscape would have determined the movement and, therefore, settlement and interaction of people on the landscape.
- Scenic historic movement routes, tarred, gravel and rail, connect the regional towns over the Central Karoo landscape with distant dramatic views of mountain ranges. These movement routes and patterns to access have informed the settlement patterns of the region. Many of the roads and farm tracks in the study site as well as surrounding area are visible on maps dating back to the 18th and 19th centuries. As a landscape that maintains a dominant characteristic of survival, conflict and change, the roads and paths that cross this landscape are an essential element, connecting the significant points, places of refuge and conflict, trade and subsistence, to each other in a challenging space over time.
- A combination of the poort and scenic historic route elements, the historic Swartberg Pass, is an identified historic scenic route and declared Provincial Heritage Site. Further east on the N12 lies Meiringspoortpass, which predates the Swartberg Pass, and connects Beaufort West with De Rust and Oudtshoorn. Other passes in the region include the Gamkasloof Pass, Seweweekspoort in the Swartberg and the Molteno Pass in the Nuweveld range to the north. Historic mountain passes provided access between coastal plains and the remote interior, and their gateway conditions are typically associated with historical patterns of settlement (Winter and Oberholzer, 2014).
- Historic farmsteads with their associated agricultural structures and linking farm roads. Many of the farm werfs include historic structures, built in the regional architecture of packed local stone, now converted into dwellings or sheds. These farmsteads are mostly situated at points of lower elevation, nestled against the hills and ridges where the soils are more suitable for agriculture, and where nearby springs or other water sources supply water for livestock and limited cultivation of crops.

Amandelhoogte and Vlieefontein have been identified as “significant Cape farmsteads” in Abrahamse’s Beaufort West Municipal Heritage Survey (2013).

- Stone walls and kraals dot the landscape as remnants of stock keeping, road building and fortifications in the area.
- Agricultural landscape with livestock, mostly sheep and cattle; fencing and associated structures line and dot the landscape. These are evidence of the human landscape modifications and patterns of land use over millennia, including seasonal grazing and pastoral uses.
- Game and nature reserves with live game and associated high fencing, drawing tourists to the region for game viewing and hunting. Game hunting has been continuous on this landscape for millennia since pre-historic inhabitants to the most recent tourist hunters and attests to the ongoing relationship between humans and the environment in this region. Although a sense of wilderness is experienced when travelling within these reserves, the height of the fences and their increased occurrence does detract from the ‘wild’ sense of place when travelling the roads around them.
- Historic town settlements and landscapes, such as Beaufort West, Prince Albert and Leeu-Gamka, associated to significant events in South Africa’s history of survival, conflict and nation-building, including many provincial heritage sites which mark people and places of value to our national estate. Matjiesfontein and the isolated Gamkaskloof Cultural Landscape have Provincial Heritage Site status.
- Military posts and forts, historic and current, constructed of local stone; material remains to the frontier zone of conflict and survival that dominated this landscape for so long. Evidence of the Anglo-Boer War in the early 1900s still remains in the form of grave sites and blockhouses along the railway line, and places such as Matjiesfontein and Prince Albert were used as garrisons by the British.
- Uranium mining sites dot the region around Beaufort West. Historic gold and diamond prospecting in the region add an additional cultural layout to this element.
- Industrial elements of transmission lines and associated infrastructure are evident along the N12 and N1. Due to their limited scale and massing along the N12 currently, they do not overwhelm or detract from the rural and historic sense of place in the area.

9.2.3.2 Landscape Character Areas

Cultural landscapes are a significant factor in the evaluation of the impact of proposed development on cultural heritage resources, tangible (e.g. Historic settlements, landscapes, technological) and intangible (e.g. language, indigenous knowledge systems, oral traditions). The areas investigated for the proposed Kraaltjies WEF are considered as having high cultural landscape heritage significance.

The Kraaltjies site can be divided into landscape character areas with cultural heritage resource types. These units were determined by taking the larger landscape context into consideration in order to understand the character and cultural heritage values that underpin the proposed development site.

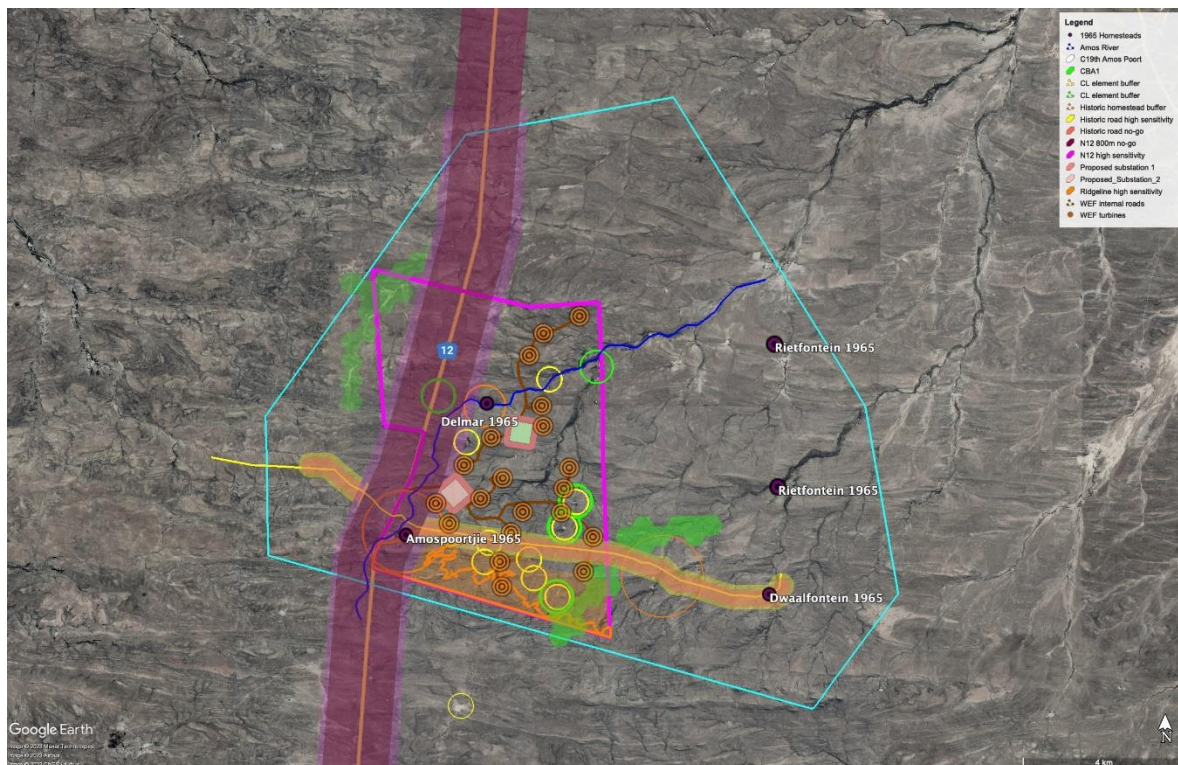


Figure 55: Kraaltjies Cultural landscape features map with proposed WEF infrastructure overlay. Orange line inside the ridgeline high sensitivity buffer is the 1040m asl, above which is a no-go for all infrastructure (Riverine corridors/ ESAs have not been included here but have been mitigated for in the recommendations)

Poorts and koppies

The vast terrain of the Koup lends significance to the low ridges and associated visually prominent koppies that create intermittent relief from the monotonous largely flat topography of the region. The small local poorts and koppies create a sense of place and orientation in this landscape and are associated to points of continuous access and thoroughfare by humans and animals over time. The farm Amospoort is associated with this landscape element.

Riverine corridors – Bio-cultural heritage resources

The dry riverine corridors that spread over the Koup landscape create points of contact and cultivation in an otherwise dry and barren environment. Largely non-perennial, these watercourses are also known for flooding after heavy rains, spreading much needed water over the surrounding land and, in so doing, supporting ecological and agricultural systems. Historic farmsteads and their associated structures and areas of crop cultivation are found in this landscape unit.

Historic farmsteads and associated crop gardens – Grade IIIA – IIIC cultural heritage resources

The farmsteads in this study are all located adjacent or near to riverine corridors. Areas of crop cultivation are found adjacent to the farmsteads, often along the dry riverbeds. The continued existence of these

farmsteads in this historically and environmentally hostile environment lends significance to their place on the landscape and the determination of the people they represent.

Conservation areas –Bio-cultural heritage resources

Critical Biodiversity Areas and Ecological Support Areas, largely associated with the riverine environment of the study area supports biodiversity conservation. These areas recognise the ongoing relationship between man and the environment in the way they are managed to maintain a natural state, which in turn, has a benefit for human habitation.

Historic routes and gateways – Grade IIIA – II cultural heritage resources

The site is accessed via the national N12 road, a historic route linking Beaufort West with the towns of De Rust and Outdshoorn via scenic Meiringspoort Pass, and the coastal town of George further south. The north south orientated N12 intersects the characteristic east west ridges with shallow poorts, often the location of historic farmsteads, such as Amospoortjie, Trakaskuilen and Amandelhoogte, culminating in the Meiringspoort Pass that winds through the Groot Swartberg mountain range located within the Swartberg Nature Reserve. This road has carried inhabitants and travellers between historic towns, farmsteads and further regional destinations since at least the late C18th. The N12 has been recognised as a scenic route in the district and municipal SDFs for the area.

Viewsheds of significant mountain ranges

Views and vistas of the distant mountains and destinations give significance to the experience of the vast open landscape. The flat open expanses of the Koup Karoo are a central element to the experience and sense of place of the landscape; the mountain ranges of the Nuiweveld to the north and Swartberg to the south give scale and containment to this vastness. Buffers for development mitigate the impact of the development on places from which significant viewsheds are experienced.

Slopes and ridges

The vast terrain of the Koup lends significance to the low undulating ridges and associated visually prominent koppies that create intermittent relief from the monotonous largely flat topography of the region. Within this relatively flat expanse the steep slopes and ridges contained in the Kraaltjies landscape are significant in their visual and environmental capacities.

9.2.3.4 Heritage Receptors

While the site has been found to have the capacity to accommodate development of this nature due to other WEF facilities that have been approved in the immediate area, the broader landscape is regarded as having a high degree of sensitivity. The landscape comprises heritage receptors of varying degrees of sensitivity to this type of development. These receptors are identified below as well as their varying degree of sensitivity to the location of wind turbines. This information serves as a guide to an assessment of the carrying capacity of the cultural landscape to accommodate the proposed development and the assessment of heritage impacts on the cultural landscape.

Table 20: Heritage receptors adapted from Oberholzer 2020

Resource	No-go areas	High sensitivity	Medium sensitivity
Heritage sites worthy of Grade I, II and IIIA heritage sites <ul style="list-style-type: none"> Amospoortjie 	0-1km	1-2km	2-5km
Heritage sites worthy of grade IIIB and IIIC heritage status <ul style="list-style-type: none"> Dankbaar (IIIC) Trakaskuilen (IIIB) Historic farm roads Crop gardens and associated infrastructure 	0-500m	500m-1km	1-1.5km
Historic scenic routes <ul style="list-style-type: none"> N12 	0-1km	1-3km	3-5km
Slopes and ridges	>30%	>10%	<10%
Water features <ul style="list-style-type: none"> Amosrivier Dourivier Farm dams 	0-250m	250-500m	-
Topographical features such as poorts, koppies and significant ridges <ul style="list-style-type: none"> Amospoort Amandelhoogte East-West ridges 	0-500m	500m-1km	-

9.3 Noise

A Noise Impact Assessment was undertaken by Enviro-Acoustic Research (November 2021). Ambient (background) noise levels were measured during June 2021 in accordance with the South African National Standards (SANS), also considering the protocols defined in Government Gazette (GN) 43110.

All the data indicated an area with a high potential to be quiet both day and night. The visual character of the study area is rural, and it was accepted that the SANS 10103 noise district classification could be rural during low wind conditions. Considering sound level data measured in similar areas, ambient sound levels will increase as wind speeds increase, and noise limits were proposed considering all available data and guidelines.

Potential Noise Sensitive Development (NSD) in the area were initially identified using aerial images as well as the Online Environmental Screening Tool, with the statuses of NSD defined based on the experience gained during previous site visits.

Also indicated on this figure are generalized 500 m, 1,000 m and 2,000 m buffer zones. Generally, noises from wind turbines:

- Could be significant within 500 m, with receptors⁵ staying within 500 m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing;
- Are normally limited to a distance of approximately 1,000m from operational wind turbines. Night-time ambient sound levels are elevated and the potential noise impact measurable;
- May be audible up to a distance of 2,000m at night; and
- Are of a low concern at distanced greater than 2,000m.

The output of the Screening Tool is presented on **Figure 41** highlighting a number of areas with a high noise sensitivity. The statuses of the sensitive areas were investigated during a previous site visit as well as using latest available aerial images.

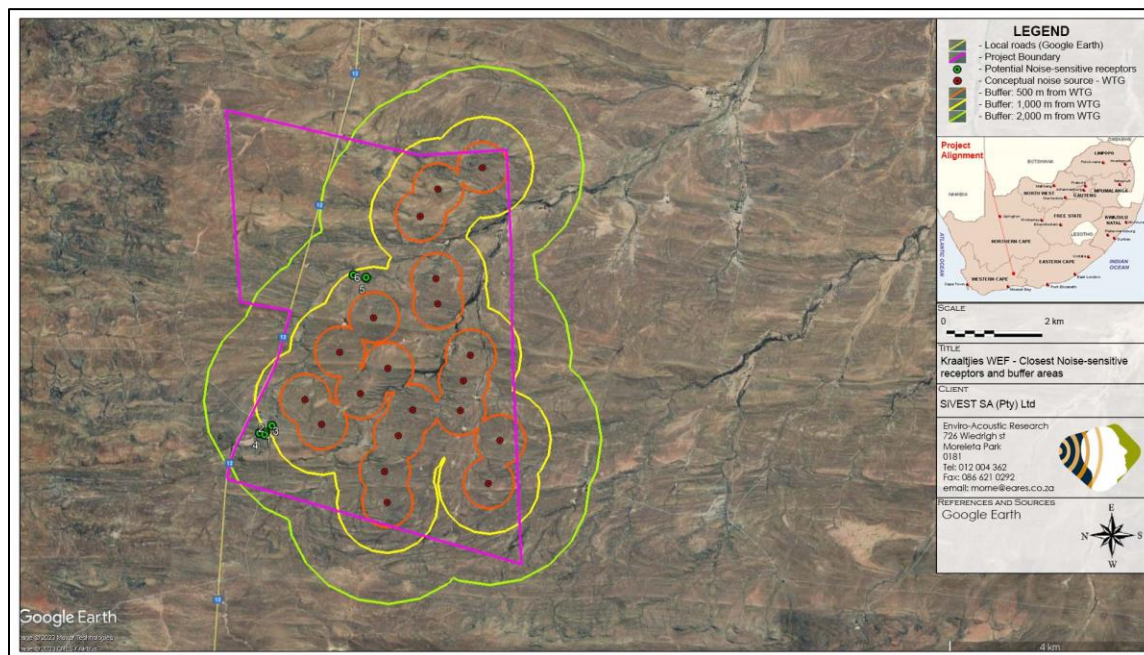


Figure 56: Aerial image indicating site sensitivity and closest identified NSD

⁵ Depending on the layout as well as the specific sound power emission levels of the selected wind turbine.

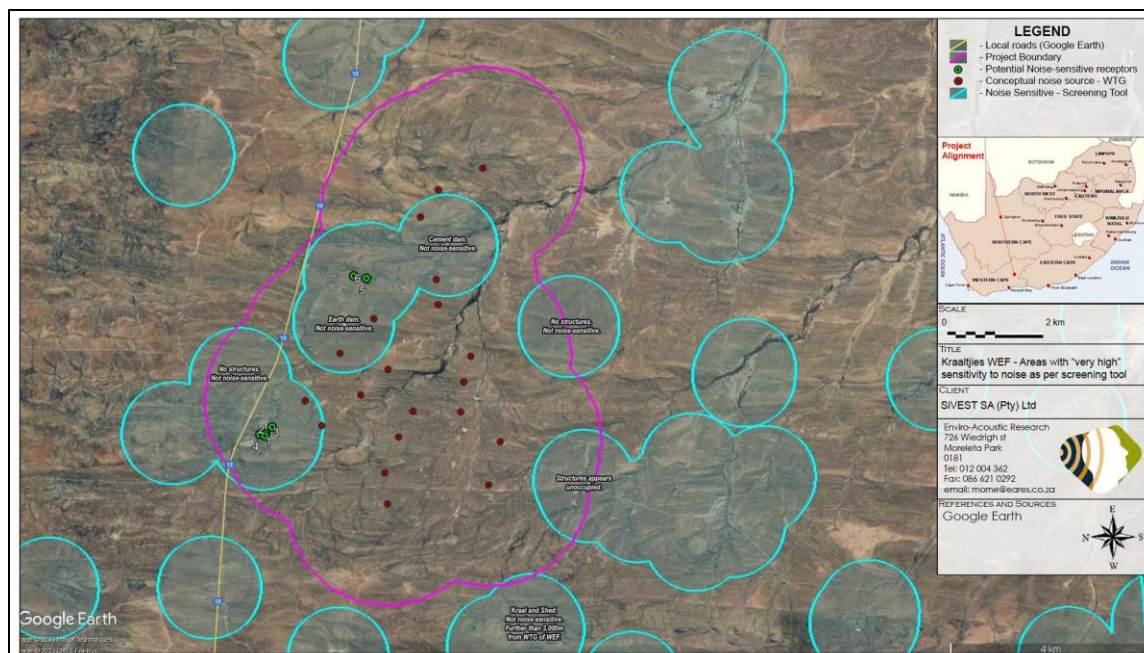


Figure 57: Aerial image indicating areas with "Very High" sensitivity to noise as per online screening tool

Ambient (background) noise levels were measured in June 2021 in accordance with the South African National Standard SANS 10103:2008 "The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication". The long-term measurements were done as per the protocols defined in GG 43110.

During the site visit, residual noise levels were measured over at least two full night-time periods as per the protocol defined by GNR 320 of 2020 (promulgated as GG 43110 of March 2020). Measurements were done at seven location using class-1 Sound Level Meters (SLMs) with the measurement localities presented in **Figure 57** as blue circles. The SLMs would measure "average" sound levels over 10-minute periods, save the data and start with a new 10-minute measurement till the instrument was stopped. The SLMs were referenced at 1,000 Hz directly before and after the measurements were taken. In all cases drift was less than 1.0 dBA.

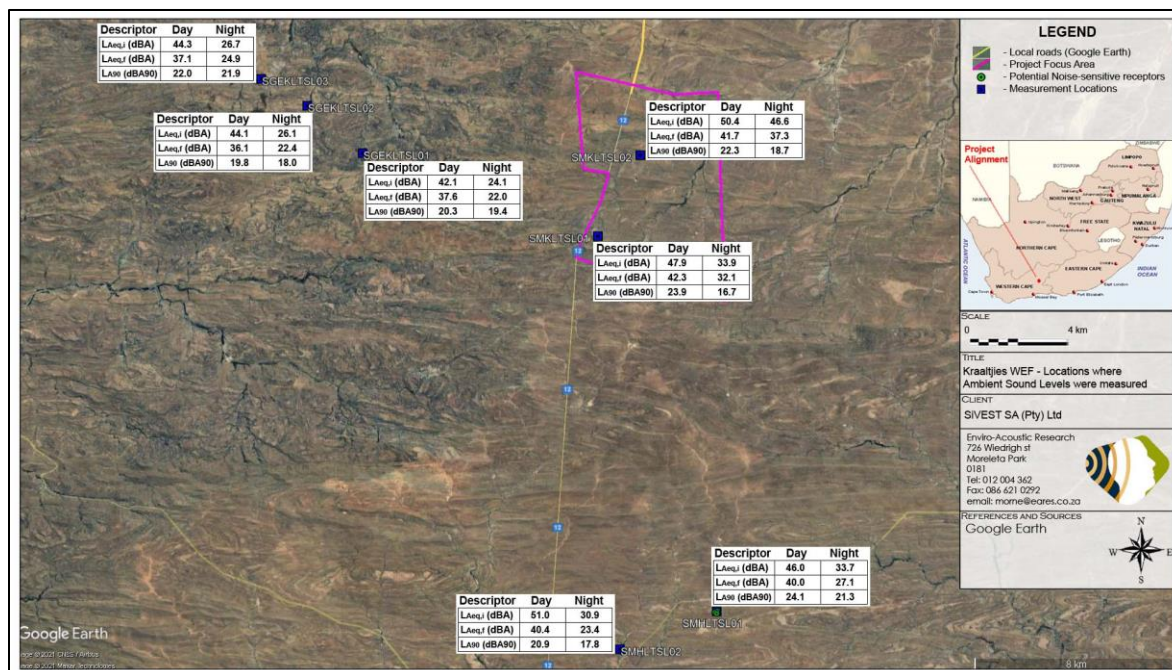


Figure 58: Localities where residual noise and noise levels were measured for at least 2 nights (40 hours)

9.4 Transport

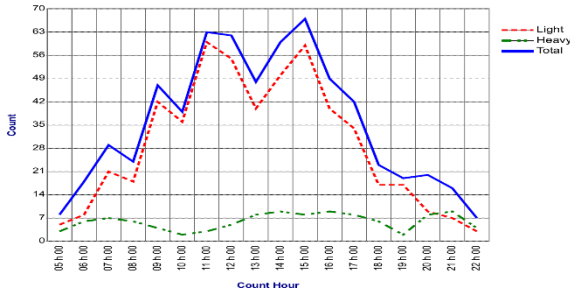
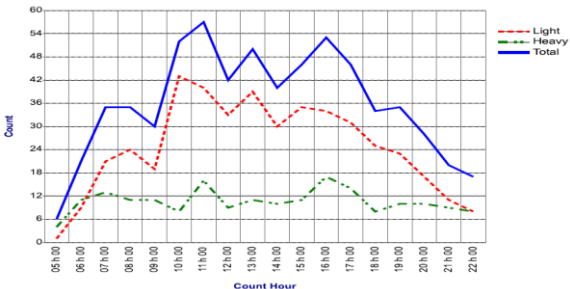
A Transportation Impact Assessment was undertaken by SiVEST SA (Pty) Ltd (September 2021).

Pre-development scenario

According to the report, the Western Cape Provincial Government makes use of a Traffic Counting System (TCS) and has served the Western Cape Provincial Network since 1999. The main emphasis of the system is on Trunk, Main and Divisional roads and at the present time only Minor roads that intersect with more important roads are on the system.

The data indicated below are from two stations on the N12 Freeway, immediately north and south of the proposed development at Km 79.41 and Km 33.23 respectively.

Table 21: Traffic Station Data / Counts

	Light Vehicles	Heavy Vehicles	Total Vehicles	Station Count Chart
N12 @ DR02304 Junction Km 79.41 Station No: 2126A Date: 12/09/2016				
Morning 7:00-8:00	19	6	25	
Weekday Midday 10:00-15:00	261	34	295	
Afternoon 16:00-17:00	35	8	43	
Average Annual Daily Trips	629	136	765	
N12 @ DR02301 Junction Km 33.23 Station No: 2125C Date: 25/10/2017				
Morning 7:00-8:00	24	11	35	
Weekday Midday 10:00-15:00	177	57	234	
Afternoon 16:00-17:00	31	15	46	
Average Annual Daily Trips	537	240	777	

Based on the table above, it can be concluded that the existing peak traffic on this section of road is a 'Weekday Midday' peak hour traffic between 10:00 – 16:00.

Access

The Kraaltjies WEF is made up of two farms: - PTN 10 of Brits Eigendom No 374 to the north and PTN 25 of Brits Eigendom No 374 to the south. The N12 freeway (Road No: TR03305) runs north south and bisects PTN 10 to the west of the farm while the same freeway is located on the western boundary of PTN 25. Both farms have access points emanating from the N12 freeway.

The N12 freeway is classified as a Class 2 in terms of the RCAM Classification – Minor Arterial and has an average road reserve width of 30m and is surfaced 7.2m wide with a 1.2m wide gravel shoulder on both sides with a design speed of 120km/h.

Various secondary access points exist along the farm boundary of the N12 with the major access point for PTN 10 of Brits Eigendom No 374 is located at Km 55.46 as indicated on the image below. As a result of the minimum prescribed sight distances for access points on Class 2 roads being 400m, the current sight distance of $\pm 240\text{m}$ between the access and the ridge to the south, is sub-standard and therefore will need to be relocated. between the access and the ridge to the south, is sub-standard and therefore will need to be relocated.



Figure 59: Existing Portion 10 Access – North Approaching



Figure 60: Existing Access to Portion 25 – South Approaching



Figure 61: Existing Access to Portion 25 – South Approaching

Two alternative access points were proposed for this facility. The proposed access points will be to the minimum standards and is strategically placed near the centre of the proposed site. Access to PTN 25 can therefore remain in its current position @ Km 51.80, however a new access position for PTN 10 will be required @ Km 54.68. Upgrades to both access positions will be required and hence approval will need to be obtained from the Western Cape Department of Transport & Public Works.

9.5 Visual

A Visual Impact Assessment was undertaken by SLR (Pty) Ltd (February 2022). According to the report, areas of flat relief, including the flat plains and higher-lying plateaus, are characterised by wide ranging vistas, although views northwards will be slightly marginally constrained by the higher lying terrain in the northern sector of the study area. However, the position of the viewer within the landscape will influence the types of vistas typically present. Viewers located within a more incised valley for example would have limited vistas, whereas much wider vistas would be experienced by viewers on higher-lying ridge tops or slopes. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that wind turbines are very large structures (potentially up to 200m in height including the rotor blades), these could be visible from a considerable area around the site. Although localised topographic variations may limit views of wind turbines from some areas in the northern sector of the study area, there would be very little topographic shielding across the remainder of the study area to lessen the visual impact of the turbines from any locally occurring receptor locations.

The high degree of visibility was confirmed by way of a preliminary visibility analysis for the proposed turbine positions as provided by Mainstream. A worst-case scenario was assumed when undertaking the analysis, in which the proposed turbines were assigned a maximum height 200 m (maximum height at

blade tip). The resulting viewshed, as shown in **Figure 62** indicates that the blade tips of wind turbines positioned on the application site would be visible from most parts of the study area.

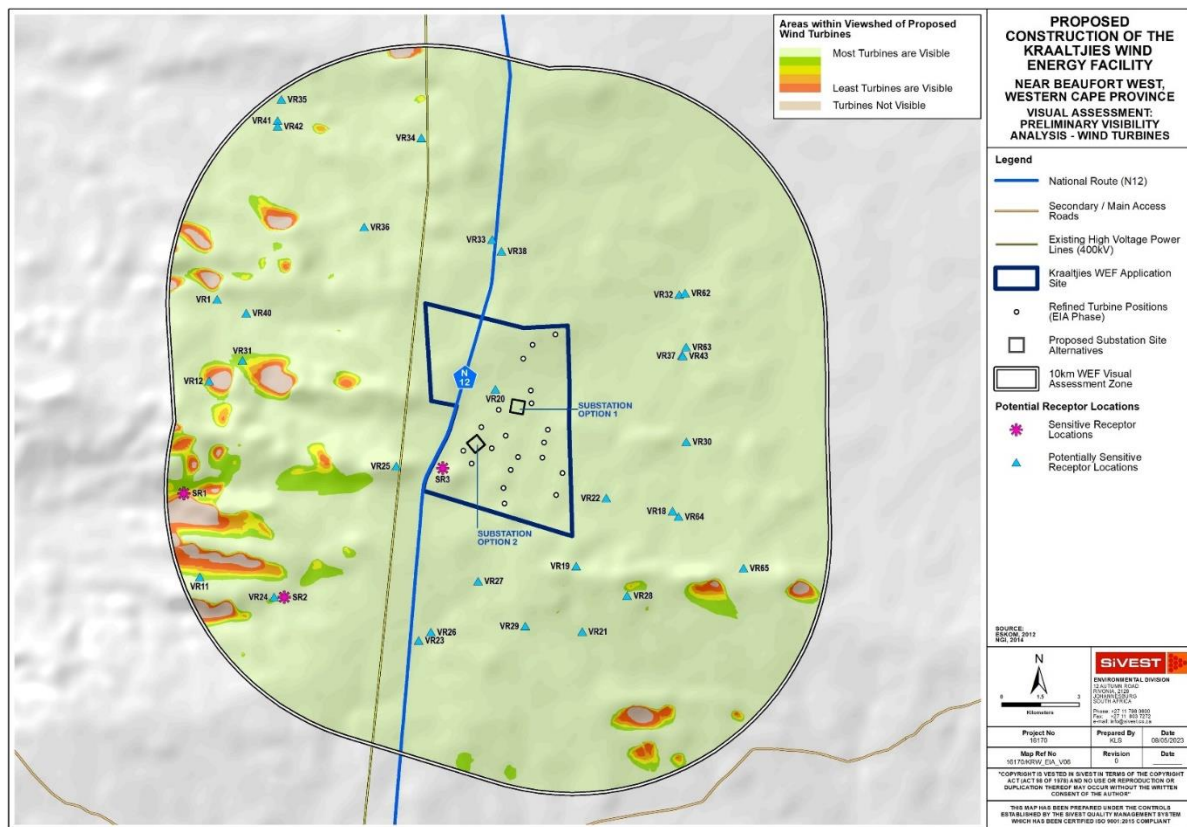


Figure 62: Potential visibility of wind turbines

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area and thus, there are very low levels of human transformation and visual degradation across much of the study area.

The short, scrubby, or grassy vegetation that occurs over the entire study area offers no visual screening in itself, and thus terrain / topography is the most important factor in limiting vistas. Exceptions to this situation occur at some local farmsteads where trees and shrubs have been established around the farmstead, providing some screening from the surrounding areas.

There are however prominent anthropogenic elements in the study area which include the N12 National Route which traverses the study area in a south to west direction (**Figure 63**) In addition, existing, electrical infrastructure, including 22kV power lines and associated substation (**Figure 64**) and 400kV power lines.

Other, less prominent elements present in the area include lower voltage power lines, telephone poles, windmills, gravel farm access roads and farm boundary fences.



Figure 63: View southwards along the N12 National Route on the south-western boundary of Kraaltjies WEF application site.



Figure 64: 22kV power lines and associated substation north of the Kraaltjies WEF application site adjacent to the N12.

The closest built-up area is the town of Beaufort West which is situated approximately 52km north of the Kraaltjies WEF application site. The town is well outside the study area for this project and is thus not expected to have an impact on the visual character of the study area.

9.5.1 The identification of visual sensitivities

Using GIS-based visibility analysis, it was possible to determine that the tip of at least one turbine blade (i.e., at a maximum height of 300m) would be visible from most of the identified potentially sensitive receptors in the study area and as such, no areas on the site are significantly more visible than the remainder of the site. It should be noted however that the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on a ridge top or a relatively high lying plateau. As such, it is recommended that wind turbines should preferably not be located on the highest ridges within the WEF development area, as far as possible. While these ridges could be seen as areas of potentially higher visual sensitivity, the study area as a whole is rated as having a low to moderate visual sensitivity, and as such, the sensitivity rating would be reduced to “Medium-High”. Hence the ridges are not considered to be “no go areas”, but rather should be viewed as zones where turbine placement would be least preferred.

The preclusion of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker. At this stage however, the visual sensitivity zones are not considered “no go” areas, but rather should be viewed as zones where development should be limited. It should be stressed that these zones on the WEF development site apply to turbine development only. The visual impacts resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

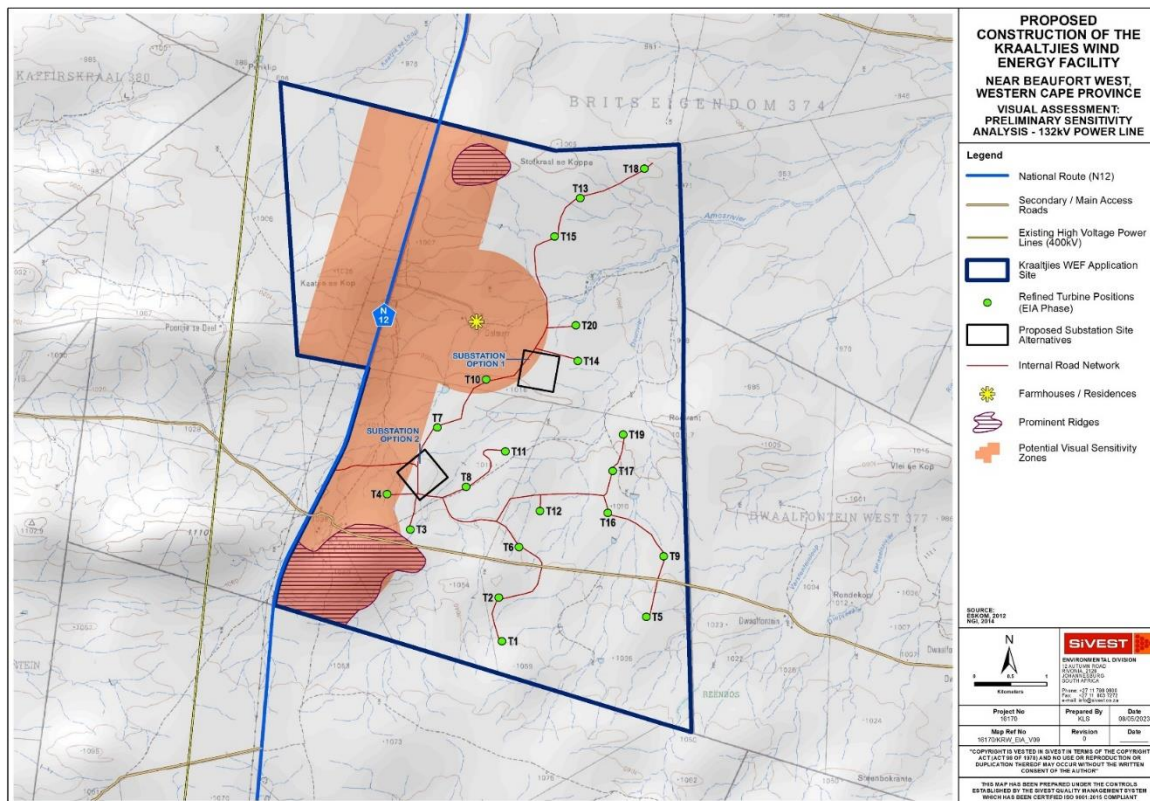


Figure 65: Visual sensitivity on the Kraaltjies WEF application site

9.5.2 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

The relatively flat topography in the study area and the relative lack of screening vegetation would reduce the visual absorption capacity across much of the area. This would be offset to some degree where the landscape has already undergone significant transformation, specifically in the areas adjacent to the N12 National route and the 400kV power lines, thus increasing the overall visual absorption capacity of the landscape.

Visual absorption capacity in the study area is therefore rated as low to moderate.

9.5.3 Receptor Identification

Preliminary desktop assessment of the study area for the proposed Kraaltjies WEF identified thirty-five potentially sensitive visual receptor locations, most of which appear to be existing farmsteads. All of these receptors were found to be within 10kms of a turbine placement in the Kraaltjies WEF EIA Phase layout.

Three of the receptors identified were found to be linked to leisure-based (specifically nature-based) tourism and are therefore considered to be sensitive receptors. One of these receptor locations, namely Rietpoort Game Farm was however found to be outside the viewshed for the EIA Phase turbine layout. The sensitive receptors in the viewshed are as follows:

- ROAM Safari Lodge; and
- Silwerkaroo Guest House.

As stated, the remaining receptors identified appear to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with natural vistas that will likely be altered by the proposed development. Local sentiments toward the proposed development are however unknown at this stage.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the N12 national route which links George and Knysna in the Western Cape with Kimberley in the north and Gauteng Province to the north-east. In the local context, the N12 is the primary access route to Beaufort West and the N1 to the north-east, and to Outdshoorn and the N9 in the south-west.

The section of the N12 traversing the study area is not considered part of a designated scenic route, although the route is an important link and is utilised, to some extent, for its tourism potential. As a result, it is considered to be a potentially sensitive receptor road – i.e. a road being used by motorists who may object to the potential visual intrusion of the proposed WEF and associated infrastructure.

Other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The identified potentially sensitive visual receptor locations for the proposed WEF are indicated in **Figure 66**.

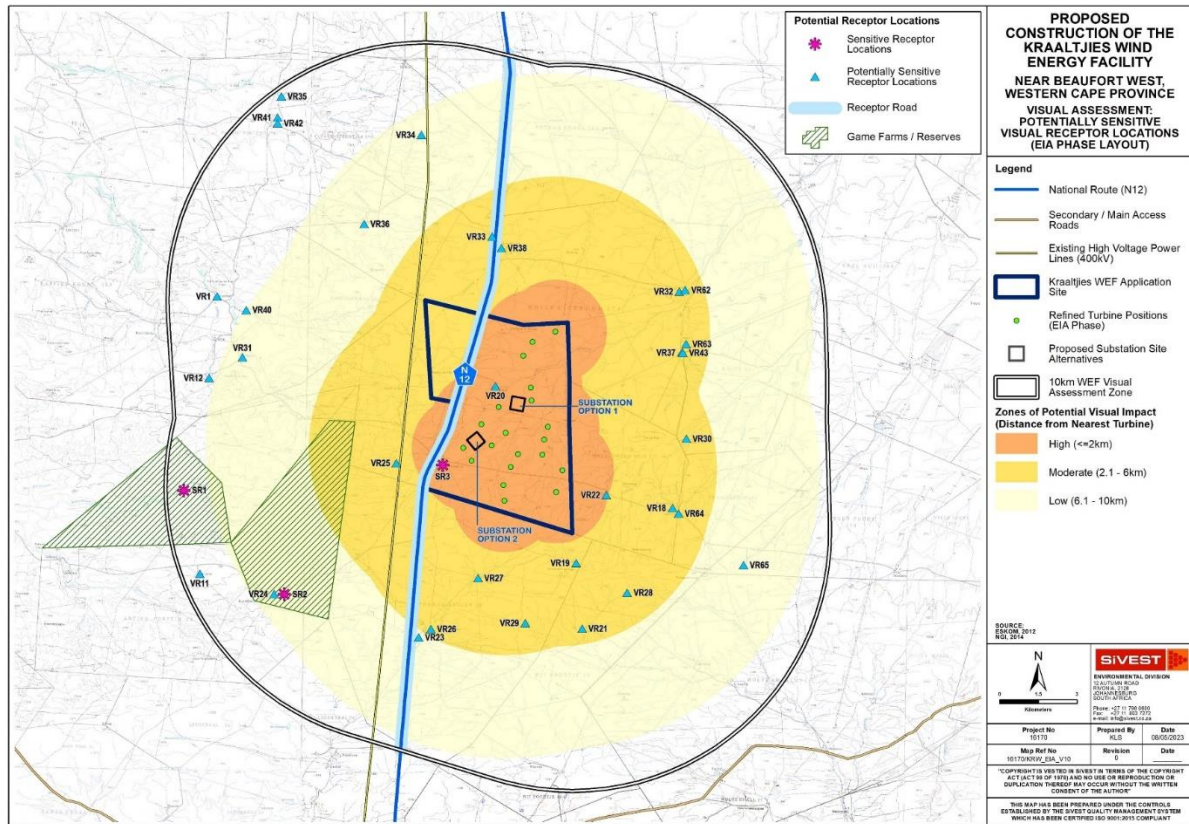


Figure 66: Potentially sensitive receptor locations within 10kms of the Kraaltjies WEF application site

9.5.4 Visual Contrast

The visual contrast of a development refers to the degree to which the development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on receptors within a specific context. A development that is incongruent with the surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- High – undeveloped / natural / rural areas.
- Moderate –
 - areas within 500m of any existing power line; in undeveloped / natural / rural area;
 - areas within 150m of cultivated land / plantations / farm buildings.
- Low – areas within 500m of N12 National Route.

These zones are depicted in **Figure 67** below.

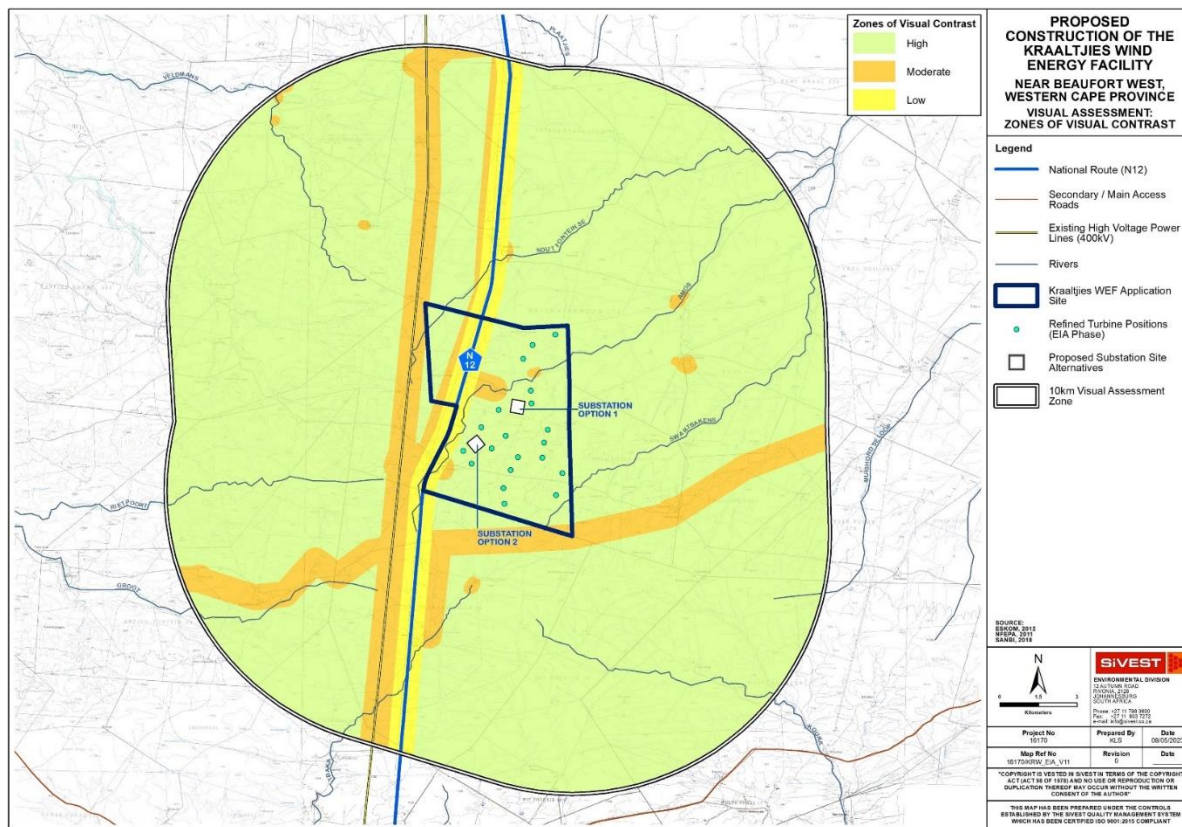


Figure 67: Zones of visual contrast within the combined study area

9.6 Wake Assessment

A Wake Impact Assessment was undertaken by DVN South Africa (Pty) Ltd (August 2023). Given the early developmental stage of the planned wind farms, the turbine model and layout for each surrounding wind farm is yet to be finalised. Therefore, the current assessment is based on information made available by the respective developers of each planned wind farm. DNV recommends that the assessment be updated as final turbine layouts and configurations become available.

All known planned neighbouring wind farms were considered in the assessment. However, there exists uncertainty in the development status of each planned wind farm. Therefore, DNV has only considered the total turbine interaction effect of the Project on each planned neighbour in isolation.

Since the Project area including all the proposed neighbouring wind farms is very large, some wind turbines are located more than 50 km from a met mast. These turbine locations are not considered as represented

by the locations of the masts. However, for the purpose of this early-stage wake impact assessment, the elevated uncertainty in the individual turbine wind speeds is deemed acceptable.

Table 22: Summary of the project and results of the wake impact analysis

Project summary	
Wind farm name	Kraaltjies Wind Farm
Turbine type	Vestas V163-4.5
Turbine hub height	96 m
Turbine rated power	4500 kW
Number of wind turbines	20
Total installed capacity (nameplate)	90
Wind resource summary	
On-site measurement period	9.1 years
Long-term reference period	12.2 years
Average wind farm hub-height wind speed	7.0 m/s
Wake impact summary	
Neighbouring wind farm impacted	Total turbine interaction loss due to the Project
Beaufort West	1.2%
Trakas	0.2%
Heuweltjies	0.1%
Kwagga 1	1.5%
Kwagga 2	0.2%
Kwagga 3	0.1%
Koup 1	0.9%
Koup 2	0.3%
Carissa E	0.6%
Carissa SW	0.4%
Carissa NW	0.1%
Jessa M	0.0%
Jessa S	0.0%
Jessa Z	0.0%

As shown in the wake impact summary, some proposed neighbouring wind farms are subject to significant turbine interaction losses resulting from the Project. However, wake impacts between neighbouring wind farms are well within what is considered to be normal in the industry. Therefore, at this early stage, DNV does not recommend any mitigation measured to reduce the impact of neighbouring wind farm wakes. Once the layouts of the Project and its neighbours are well defined, a CFD assessment of wakes and blockage losses could be performed to more accurately capture turbine interaction losses at the Project area.

Although the wake impacts are within normal levels, the resulting loss in revenue could be accounted for in the financial modelling of the proposed wind farms by either:

- entering into a wake compensation agreement to mitigate against lost revenue in the case of a neighbouring project reaching financial close before the Project,
- or including the wakes of the Project as an existing wind farm in the financial modelling of the neighbouring wind farm in the case of the Project reaching financial close first.

The key contributions to the uncertainty level of the estimate are:

- Given the early developmental stage of the planned wind farms, the turbine model and layout for each wind farm is yet to be finalised. Therefore, the current assessment is based on information made available by the respective developers of each planned wind farm. DNV recommends that the assessment be updated as final turbine configurations become available.
- There is some uncertainty in using a flow model such as a mesoscale mapping to capture the wind speed variation across such a site, especially because of strong atmospheric stability cycles and the very large distances between some wind turbines and the masts.
- Since the Project area including all the proposed neighbouring wind farms is very large, some wind turbines are located more than 50 km from a met mast. These turbine locations are not considered as represented by the locations of the masts. However, for the purpose of this early-stage wake impact assessment, the elevated uncertainty in the individual turbine wind speeds is deemed acceptable.
- All known planned neighbouring wind farms were considered in the assessment. However, there exists uncertainty in the development status of each planned wind farm. Therefore, DNV has only considered the total turbine interaction effect of the Project on each planned neighbour in isolation.

10. POLICY AND LEGISLATIVE CONTEXT

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

10.1 The Constitution

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

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

Section 24 of the Constitution states that:

“Everyone has the right –

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
 - Prevent pollution and ecological degradation;
 - Promote conservation and

- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

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

10.2 National Environmental Management Act (107 of 1998)

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

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

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

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

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

The proposed project triggers listed activities under Listing Notice 1, 2 and 3 (as detailed in Section 7 above), and thus requires an EA subject to an Environmental Impact Assessment (EIA) Process.

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

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

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

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

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

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

10.4 National Water Act (Act 36 of 1998)

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

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

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

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

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

In light of the above, there are a number of stipulations within the NWA that are relevant to the potential impacts on rivers, streams and wetlands that may be associated with the proposed development. A Surface Water Impact Assessment (**Appendix 6**) has been conducted to explore how the proposed development may impact on identified water resources as protected by the Act. Should the proposed development

require a General Authorisation (GA) or Water Use Licence (WUL), it will be determined and applied for separately prior to construction.

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

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

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

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

- a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site—
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m² in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

The proposed development would involve; (c) the development of a WEF and associated infrastructure that will change the character of more than 0.5ha, and (d), the rezoning of a site that will exceed 1ha.

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

A Notice of Intent to develop (NID) was submitted to HWC by PGS Heritage on the **01 December 2022**.

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

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

As the principal national act regulating biodiversity protection, the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004), which is administered by the DFFE, is concerned with the management and conservation of biological diversity, as well as the use of indigenous biological resources in a sustainable manner.

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

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

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

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

The South African National Biodiversity Institute (SANBI) was established in terms of the NEM:BA, its purpose being (inter alia) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

The NEM:BA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a 'restricted activity' involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7 of the Act. According to Section 57 of the Act, 'Restricted activities involving listed threatened or protected species':

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

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

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

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

- the declaration and management of protected areas;
- co-operative governance in the declaration and management of protected areas;
- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- the continued existence of South African National Parks.

The proposed project is not located in close proximity to any protected areas.

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

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

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

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

Protected trees

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

Forests

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

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

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

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

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

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

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

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

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

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

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

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

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

An Agricultural and Soils Site Verification and Compliance Statement (**Appendix 6**) has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site.

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

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

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

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

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

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

The Air Traffic and Navigation Services Company Limited (ATNS) and the SACAA will be consulted throughout the EIA process and the required approvals will be obtained, where necessary.

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

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

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

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

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

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

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

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

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

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

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

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

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

The objectives of the regulations include:

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

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

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

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

Ultimately the Act promotes “the protection of personal information processed by public and private bodies; to introduce certain conditions so as to establish minimum requirements for the processing of personal information; to provide for the establishment of an Information Regulator to exercise certain powers and to perform certain duties and functions in terms of this Act and the Promotion of Access to Information Act, 2000 (PAIA); to provide for the issuing of codes of conduct; to provide for the rights of persons regarding unsolicited electronic communications and automated decision making; to regulate the flow of personal information across the borders of the Republic; and to provide for matters connected therewith”.

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

10.17 Renewable Energy Development Zones and Strategic Transmission Corridors

The Strategic Environmental Assessment (SEA) for Wind and Solar PV Energy in South Africa (CSIR, 2015) originally identified eight (8) formally gazetted Renewable Energy Development Zones (REDZs) that

are of strategic importance for large-scale wind and solar PV development in terms of Strategic Integrated Project 8: Green Energy in Support of the South African Economy, as well as associated strategic transmission corridors, including the rollout of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

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

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

Table 23: The SEA for Wind and Solar PV Energy in South Africa (Phase 1 and Phase 2) (CSIR, 2015; CSIR, 2019) identified the following eleven (11) geographic areas for REDZs

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

It should be noted that the proposed project is not located within a REDZ and will be subject to a full EIA process in terms of the NEMA, as amended, and the EIA Regulations, 2014 (as amended).

10.18 Additional Relevant Legislation

- Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA];

- Environment Conservation Act (Act 73 of 1989) [ECA]
- Road Safety Act (Act No. 93 of 1996) [RSA];
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) [NEM:AQA];
- National Environmental Management: Waste Act (Act No. 59 of 2008, as amended) [NEM:WA];
- Development Facilitation Act (Act No. 67 of 1995) [DFA];
- Promotion of Access to Information Act, (Act No. 2 of 2000); [PAIA]
- The Hazardous Substances Act (Act No. 15 of 1973) [HSA];
- Water Services Act (Act No. 108 of 1998) [WSA];
- Municipal Systems Act (Act No. 32 of 2000) [MSA];
- Spatial Planning and Land Use Management Act (Act No. 16 of 2013) [SPLUMA];
- Subdivision of Agricultural Land Act, 70 of 1970, and
- Mineral and Petroleum Resource Development Act (Act No. 28 of 2002, as amended) [MPRDA].

11. KEY DEVELOPMENT STRATEGIES AND GUIDELINES

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

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

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

The DoE gazetted its White Paper on Renewable Energy in 2003 and introduced it as a 'policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.' At that time, the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy

contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and biofuels. Since the White Paper was gazetted, South Africa's primary and secondary energy requirements have remained heavily fossil-fuel dependent, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this, the projected electricity demand of the country has led the National utility Eskom, to embark upon an intensive build programme to secure South Africa's longer-term energy needs, together with an adequate reserve margin.

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

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

A more efficient and competitive infrastructure is envisaged, particularly infrastructure that facilitates economic activity and is conducive to growth and job creation. The plan identifies key services that need strengthening; namely commercial transport, energy, telecommunications and water, while ensuring their long-term affordability and sustainability. The National Planning Commission maintains that South Africa has missed a generation of capital investment in many infrastructure opportunities including electricity. Therefore, one (1) infrastructure investment priority is in the procurement of at least 20 000MW of renewable energy-efficiency (National Planning Commission, 2011).

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

- National Integrated Resource Plan for Electricity (2010-2030);
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended;
- Western Cape Strategic Plan 2019-2024
- The Western Cape Spatial Development Framework (SDF) 2014
- Central Karoo District Municipality Integrated Development Plan, 2020 – 2021 Beaufort West Municipality IDP 2023/2024

11.1 Western Cape Strategic Plan 2019 - 2024

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

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

11.1.1 The Western Cape Spatial Development Framework (SDF) 2014

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

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

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

11.2 Central Karoo District Municipality Integrated Development Plan, 2020 – 2021

The Central Karoo DM has identified the “potential and impact of renewable energy resource generation, as part of the district’s economic profile (Central Karoo District Municipality, 2019, pp. 16, 79, 80 & 81)

The Municipality indicates that it will move to less carbon-intensive electricity production through procuring at least 20 000MW of renewable energy by 2030, increased hydro-imports from the region and increased demand-side measures, including solar water heating.

The IDP further mentions that the introduction of renewable energy generation and the Square Kilometer Array project in the greater Karoo region, as well as possible exploration for shale gas, will add value to the Gross Domestic Product (GDP) within certain economic sectors and, by implication, change the composition and character of the towns. Further suggestions are at developing an Alternative Energy Strategy for the Central Karoo.

11.2.1 Beaufort West Local Municipality Integrated Development Plan (2017 - 2022)

The Municipality has a responsibility to take care of the natural environment for future generations to enjoy a clean and safe environment, in which biodiversity is conserved and tourism is maximised. The Beaufort West Integrated Development Plan 2021/22 4th Annual Review therefore lists Clean Energy as its Sustainable Development Goal 7 (Beaufort West District Municipality, 2017, p. 61 & 63).

The IDP indicates that natural resources should be used more efficiently and investment in green technologies pursued in order to ensure that there is enough water and energy for the growing economy. The Municipality needs to be more robust and resilient so that it can respond to the challenges of climate change and other natural hazards.

In terms of major infrastructure projects planned for the municipality, they also hope to “*Promote domestic and large wind and solar energy projects subject to appropriate guidelines and siting principles*”.

12. NEED AND DESIRABILITY

12.1 National Renewable Energy Requirement

In 2010, South Africa had 44,157MW of power generation capacity installed. Current forecasts indicate that by 2025, the expected growth in demand will require the current installed power generation capacity to be almost doubled to approximately 74,000MW (SAWEA, 2010).

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

The use of renewable energy technologies, as one (1)10 of a mix of technologies needed to meet future energy consumption requirements is being investigated as part of Eskom's long-term strategic planning and research process. It must be remembered that wind energy is plentiful, renewable, widely distributed, clean and reduces GHG emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

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

12.2 National Renewable Energy Commitment

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

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

12.3 Wind Power Potential in South Africa and Internationally

Onshore wind energy technology is the most commonly used and commercially developed renewable energy technology in South Africa as wind is abundant and inexhaustible (DEA Guideline for Renewable Energy, 2015). Wind energy is one (1) of the lowest-priced renewable energy sources and is economically competitive (www.wasaproject.info).

12.4 Site Suitability

The location of the proposed Kraaltjies WEF (this application) and the proposed Eskom portion of the on-site Substation (including the associated 132kV power line development that will serve the Kraaltjies WEF (part of separate respective BA process)) include several key aspects which underpin it's suitability such as wind resource, grid connection suitability as well as environmental, competition, topography and access.

1. Wind resource is the first of the main drivers of determining viability of the wind farm development across South Africa. The developer has confirmed suitability of the area from a wind resource perspective.
2. Environmental suitability is the second key aspect that the Applicant considers when evaluating a wind energy project. The project should be developed in a sustainable and ecologically friendly manner ensuring its development has the least possible impact on the land on which it will be built.
3. The third primary driver of site selection is capacity on the local transmission system to evacuate the power into the national grid. In this case, the Kraaltjies WEF will be connected to the national grid through a 132kV distribution line from the 11-33kV/132kV Project on-site substation (this application) / Eskom substation (Eskom substation and 132kV powerline to form part of the separate BA process). The grid connection solution proposed herein is considered to be a benefit as the connection proposed seeks to reduce the power line extent as far as possible from that required to connect the facility to the national grid.
4. Other key criteria which refine the site selection on a micro level include competition, topography, land use, access and availability of land.

The site proposed for the Kraaltjies development is located in the scenic Karoo region of the Western Cape Province, which is generally associated with wide vistas and mountainous landscapes. The topography in the immediate vicinity of the site is however characterised by flat to gently undulating

plains interspersed with areas of localised hills and koppies. The flat plains that make up the project area make it a good site to establish a WEF from a technical perspective as it is strategically located away from the localised hills and koppies as far as possible, but to harness the wind resource available in the surrounding area.

The farm is located in a sheep farming agricultural region and grazing of sheep and game is the dominant agricultural land use on the site and surrounds. Grazing capacity of the site is low at 32 hectares per large stock unit. Due to the extreme aridity constraints as well as the poor soils, agricultural land use is restricted to low intensity grazing only. It should be noted that the area is not valued for its agricultural potential and the proposed development will only impact agricultural land which is of extremely low agricultural potential and is unsuitable for cultivation. Furthermore, the current agricultural activities in the form of grazing can co-exist with the wind farm making dual use of the land possible for both renewable energy production as well as agricultural production.

The project site is easily accessible off the N12. Access to the Kraaltjies WEF will be from the existing access, located along the farm boundary of the N12 with the major access point for PTN 10 located at Km 55.46.

12.5 Reduce dependency on fossil fuels

At present, more than 90% of South Africa's energy is generated by coal-fired power stations. Apart from the fact that these are finite resources that will eventually run out, fossil fuels are also harmful to the environment when used to produce electricity. During combustion, fossil fuels such as coal emit many by-products into the atmosphere, two (2) of which are carbon dioxide (CO₂) and sulphur dioxide (SO₂). Both these gases have been shown to contribute to the worsening climate crisis. Wind is a free and infinite resource that occurs naturally in the environment. Converting wind energy into electricity releases no harmful by-products into the environment and will reduce the dependency on fossil fuels.

12.6 Stimulate the economy

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

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

Some of the local businesses could benefit from sub-contracting opportunities, if the construction companies appointed by the developer implement a local community procurement policy, and consumer

expenditure of the construction crew. Furthermore, the demand for hospitality services (including accommodation and catering in the towns Beaufort West and other nearby towns) is expected to increase and provide for much-needed stimulus for the local economy.

Apart from jobs the project is also likely to stimulate the local economy, which is likely to be most significant at a cumulative level. Nevertheless, there will be a significant economic contribution attached to the Kraaltjies Wind Facility. This contribution will be in the form of disposable salaries and the purchases of services and supplies from the local communities in and around the towns of Beaufort West and Prince Albert. The capital expenditure on completion of the project is anticipated to be in the region of R 2.5 billion.

Apart from job creation and procurement spend; the project will also have broader positive socio-economic impacts as far as socio-economic development contributions are concerned. Although, at the point of writing, the project developer had not as yet put a corporate social responsibility plan in place, the intention is to either fall in line with the REIPPP BID guidelines or to put an equivalent plan in place. This will create an opportunity to support the local community over the life span of the operational phase of the project, which will stretch over a 20-year period. At a national level the project also has the potential to contribute towards the national grid requirements as part of the Government's vision to source 15.1% of the country's energy through wind power (Department of Energy Republic of South Africa, 2018, p. 41).

12.7 Job opportunities and household livelihoods

Wind energy projects create both temporary and permanent job opportunities in South Africa for both skilled and unskilled workers. According to the Social Impact Assessment that was undertaken (May 2021), *the project will lead to the creation of both direct and indirect jobs which will have a positive economic benefit within the region. In this regard, there are approximately 300-400 jobs associated with the construction phase of the project and approximately 20 jobs associated with the operational phase. Of these jobs approximately 165-220 (55%) of the employment opportunities will be available to low-skilled workers (construction labourers, security staff etc.), ~90-120 (30%) to semi-skilled workers (drivers, equipment operators etc.), and ~45-60 (15%) for skilled personnel (engineers, land surveyors, project managers etc.). Many of the low and semi-skilled employment opportunities will probably be available to residents in the area, specifically residents from Beaufort West and Prince Albert. Many of the beneficiaries are likely to be historically disadvantaged members of the community and the project will provide opportunities to develop skills amongst these people. The operational phase will employ approximately 20 people full time for a period of up to 20 years. Of this, approximately 4 are low skilled, ~10 are semi-skilled and 6 are skilled.*

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

Household earnings are linked closely with trends in employment and, as such, will be affected positively by the creation of jobs as discussed above. The creation of temporary jobs during the construction period will temporarily increase affected households' income. Some of this income will be earned by workers from the local communities. Given that the average household income in the area is R29 400, a significant boost

in household income may prevail. A temporary increase in living standards based on the additional monthly income will thus ensue. Employees working for local businesses that will be sub-contracted to supply goods and services to the WEF during construction are also expected to benefit indirectly.

12.8 Skills development

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

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

12.9 Proximity to substation

The area is well situated, as described above, with good wind resources suitable for the installation of a large WEF. In addition to this, the project area is in close proximity to connectivity opportunities. The surrounding area is not densely populated and should therefore not impact on people's livelihoods living in the area. The development will be connecting to the Beaufort West/Trakas wind farm Varsfontein substation or the Galenia MTS (whichever Eskom prefer) which is located approximately 6km south of the site. This will be further assessed in the EIA Phase.

13. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE AS CONTAMPLATED IN THE SCOPING REPORT

The layout that was included in the Scoping Phase reporting has been refined based on specialist findings and a final proposed layout has been compiled for approval (refer **Figure 68** and **Figure 69** below). The final proposed layout / preferred development footprint that is being put forward is the most feasible layout configuration. The layout has been designed and refined based on information from the scoping phase through to the impact assessment phase which has resulted in a layout where all turbine and supporting infrastructure with the exception of certain internal roads (including associated underground cabling) and the guard house) avoids the no-go areas identified.

All no-go areas identified to date by the specialists as indicated in the sensitivity mapping below have been taken into account and the turbines and supporting infrastructure (including roads) shifted where necessary to inform the proposed turbine and associated infrastructure layout for the Kraaltjies WEF. The bat and bird

specialist has indicated that development of infrastructure within the high sensitivity zones is acceptable as long as care is taken, as per the EMPR, not to destroy any bat roosts. Refer **Figure 68** below of the turbine and supporting infrastructure layout.

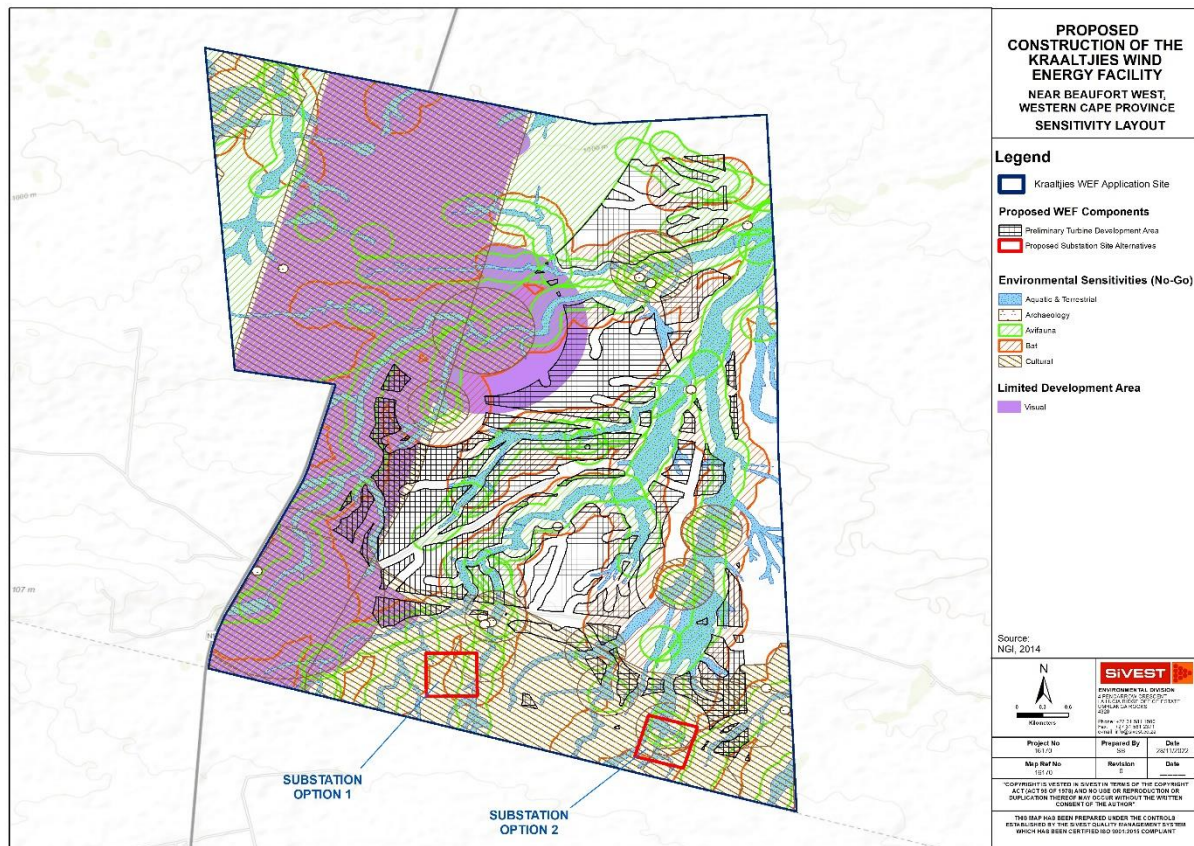


Figure 68: Development site layout with sensitivities submitted as part of the Scoping Phase

The provided turbine and associated infrastructure layout has avoided any sensitive aquatic features and associated buffer areas (with the exception of roads and associated underground cabling powerlines), significantly reducing the potential overall impact and risk to aquatic resources on the study site. Several High Sensitivity Habitats were observed and mapped, and these were then considered No-Go for any turbine and associated infrastructure, while Moderate and Low sensitivity areas could be considered for development. Again, it is noted that the only exception being road crossings and transmission lines which would be considered acceptable within No-Go areas.

The avifaunal undertook a site sensitivity visit to identify key priority species nesting within the project or neighbouring properties which may require buffering out of large portions of the proposed project site. A Martial Eagle nest is present on Tower 108 of the Droërvier Proteus 1 - 400kV transmission line, 5km from the closest proposed turbine location, and approximately 1km from the closest border of the project site. A 5 km no-go buffer was recommended around the nest to reduce the risk of turbine collision. The Kraaltjies WEF has therefore avoided these buffers which in turn informed the development footprint.

The bat specialist has stated that even though the site is classified as high sensitivity, the client has already applied mitigation by shifting all turbine positions outside of high sensitivity zones, so that no operating turbine components are placed in these areas. Supporting infrastructure, such as the roads, laydown area, on-site sub-station and the Battery Energy Storage System may infringe on the sensitivity areas, if necessary, but care must be taken to avoid any destruction of possible bat roosts, as per the EMPr.

No fatal flaws have been identified by any of the specialists and all impacts can be mitigated to acceptable levels.

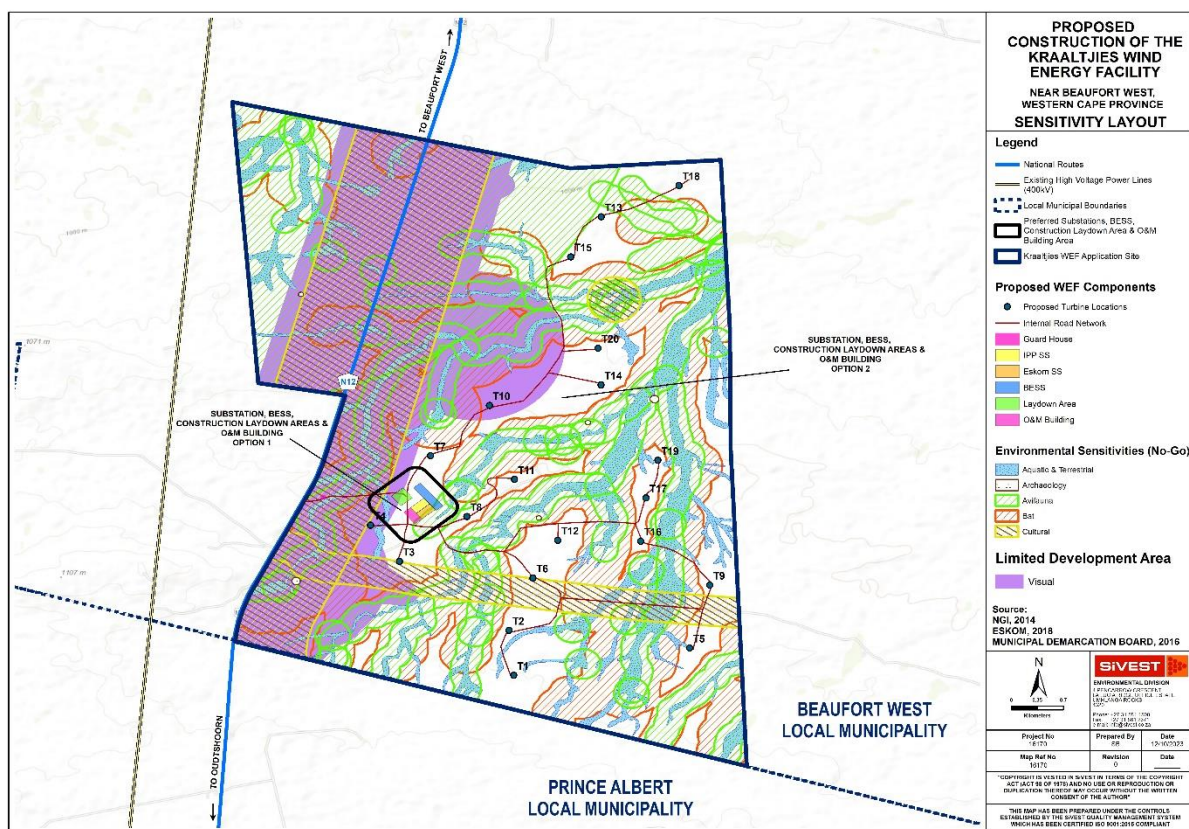


Figure 69: Final proposed layout/development footprint with site sensitivities

The following updates have been made to the layout:

- Substation locations have been moved outside of the highly sensitive areas as identified by the specialist including aquatic, ecology, bird and bat amongst others.

- It was proposed in the scoping phase that the turbine number will be up to 60, however due to further sensitive areas identified by the specialists, the layout being put forward is now for approval consist of only up to 20 turbines.
- All turbines are placed outside of the no-go areas identified by specialists.

The proposed final layout has therefore considered the sensitivities identified throughout the process and has informed the final proposed development footprint and layout put forward for authorisation.

14. DETAILS OF PROCESS FOLLOWED TO REACH THE PREFERRED OPTION

14.1 Details of alternatives

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

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

Each of these alternatives are discussed in relation to the proposed development in the sections below. The EIA Regulations, 2010 guideline document stipulates that the environmental investigation needs to consider feasible alternatives for the proposed development. The developer should be encouraged to consider alternatives that would meet the objective of the original proposal and which could have an acceptable impact on the environment. The role of alternatives in the EIA process is therefore to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and/or through reducing or avoiding potentially significant negative impacts.

14.1.1 Location/Site alternatives

Prior to the initiation of the EIA, alternative properties / sites were considered for the location of the proposed development. The selection of a potential wind project site includes several key aspects including wind resource, environmental, grid connection suitability landowner agreements as well as competition, topography and access. This proposed project site was selected based on the above criteria ahead of other regional properties / sites due to the cumulative assessment of all criteria. This internal process takes several weeks to complete and ensures that the least environmentally sensitive property / site is selected in the specific region of development.

No site alternatives have been considered during the EIA process for this proposed development. The placement of wind energy installations is dependent on the factors discussed above, all of which are favourable at the proposed site location. The proposed project site has topography which is suitable for the development of a WEF. In addition, the proposed project site also has a low agricultural intensity. The project site is easily accessible off a dirt road off the N12. The site is therefore considered highly suitable for the proposed development of a WEF, and no other site locations have been considered during the EIA process.

14.1.2 The type of activity to be undertaken

No other activity alternatives have been considered. Renewable Energy developments in South Africa are highly desirable from a social, environmental and development perspectives respectively. Wind energy installations are more suitable for the proposed site because of the high wind resource.

South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although wind energy is not the only solution to solving the energy crisis in South Africa, it is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

14.1.3 The technology to be used in the activity

Wind turbine technology is developing at a rapid pace and could evolve by the time the project reaches the construction phase. Therefore, various wind turbine designs and layouts have been considered for the site in order to maximise the electricity generation capacity and efficiency, whilst taking into account the environmental constraints. The turbine manufacturer and turbine model has not yet been determined and will not be decided upon until the completion of further wind analysis and competitive tendering.

Furthermore, from a policy perspective the 2019 IRP indicated a higher allocation target to wind energy compared to solar energy for new additional capacity from 2022 to 2030 (i.e. 14 400 MW as opposed to 6 000 MW) which further supports the development of a WEF at this location. Based on the above, a WEF at the proposed location is considered to be reasonable and feasible and therefore is selected as the preferred technology alternative as it would be able to generate sufficient energy to support an economically viable wind energy project. No technology alternatives will be considered.

14.1.4 Design or layout of the activity

Two (2) on-site substation site alternatives were considered. Each on-site substation assessment area is approximately 25 ha in extent. The actual substation however will be 4ha which will be split into two (2) portions: The IPP 11-33kV portion (2ha) and the Eskom 132kV switchyard portion (2ha). The Eskom 132kV switchyard portion will form part of a separate environmental authorisation application.

The Two (2) on-site substation site alternatives were comparatively assessed by the EAP and various environmental specialists during the scoping phase. The specialist studies identified the environmental constraints which resulted into the layout being further refined by moving the substation locations to the current proposed positions by accounting for and avoiding the constraints identified from the various specialists throughout the EIA process. The WEF has been designed to avoid the relevant turbine no-go areas, as well as highly sensitive areas as far as possible.

14.1.5 No – go option

The option of not implementing the activity, or the “no-go” alternative, has been considered in the EIA process. South Africa is under immense pressure to provide clean sources of electricity generating capacity in order to reduce the current electricity demand from aging and polluting coal-fired power stations. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although wind energy is not the only solution to solving the energy crisis in South Africa, not establishing the proposed WEF and associated infrastructure would be detrimental to the mandate that the government has set to promote the implementation of renewable energy. It is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will thus aid in achieving South Africa’s goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

The no-go alternative will result in the current status quo being maintained as far as the avifauna, bats and the aquatic systems are concerned. The low human population in the area is definitely advantageous to sensitive avifauna, especially Red Data species. The no-go option would therefore eliminate any additional impact on the ecological integrity of the proposed development site.

With regard to heritage resources, even without development, fossils will still be destroyed by natural weathering and erosion. In the case of the No-Go Alternative the possible loss of local heritage resources through construction activities would be avoided, however potential improvements in palaeontological understanding through professional mitigation - i.e. recording and collection of palaeontological material and data would be lost. The slow destruction of fossils exposed at the surface through natural weathering and erosion would continue, but at the same time new fossils are revealed for scientific study. On balance, it is concluded that no-go alternative would have a neutral impact on palaeontological heritage.

From a noise perspective, existing residual noise levels will remain as is within the project focus area. The specialist noted that it is difficult to assess how the no-go option will impact on the soundscape, as different people will value the existing residual noise levels differently. A person that retired to the area (within 2,000 m from the closest wind turbine) will set a high value to the existing residual noise levels, while the landowner that may financially benefit from the project will have a much lower appreciation of existing residual noise levels. Based on the specialist’s opinion, the no-go option will result in a positive benefit of low significance.

From an agricultural perspective the no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential impact is that due to continued low rainfall in the area, which is likely to be exacerbated by climate change, agriculture in the area will come under increased pressure in terms of economic viability. The development offers an

additional income source to agriculture, without excluding agriculture from the land. Therefore, the negative agricultural impact of the no-go alternative is more significant than that of the development, and so, purely from an agricultural impact perspective, the proposed development is the preferred alternative.

From an avifaunal perspective, the no-go alternative will result in the current *status quo* being maintained. The low human population in the area is definitely advantageous to sensitive avifauna, especially Red Data species. The no-go option would eliminate any additional impact on the ecological integrity of the proposed development site as far as avifauna is concerned.

From a bats perspective, if the development does not progress, the status quo is expected to prevail, and no negative impact is expected. The ideal concerning managing the impact of WEFs on bats throughout the project's lifespan is to maintain bat populations as they occur on site and avoid attracting more bats to the area of potential collision.

From a landscape perspective, the no-go alternative will result in the current *status quo* being maintained as far as the cultural landscape is concerned and it should continue to operate in the similar way maintaining the current significance. If the project is not developed, infrastructure will not be built to the west of the N12 and the aesthetic and visual impact of new RE developments will be contained to the eastern viewshed.

From an aquatic perspective, Should the project not proceed, then current status quo with regard the aquatic environment would remain unchanged. Overall, these catchment and subsequent rivers / watercourses are largely in a natural state. Present day impacts do occur in localised areas and included the following:

- Erosion as a result of road crossings;
- Several farm dams; and
- Undersized culverts within present day road crossings, although very few occur on site.

The no-go option would also mean that the social environment is not affected as the status quo remains. On a negative basis, it also means that all the positive aspects associated with the project would not materialise. Consequently, there would be no job creation, no revenue streams into the local economy and municipal coffers, and a lost opportunity to enhance the National Grid with a renewable source of energy. Considering that Eskom's coal-fired power stations are a huge contributor to carbon emissions, the loss of a chance to supplement the National Grid through renewable energy would be significant at a national, if not at a global level.

The area would also retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

The no-go alternative is not currently the preferred alternative by the Applicant. No fatal flaws have been identified by the specialists and all have indicated that project should proceed with the proposed mitigation measures taken into account.

14.2 Details of Public Participation Process undertaken

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

14.2.1 Identification of Key Stakeholder and I&AP's

Liaison with the relevant authorities plays a crucial role in the successful completion of any environmental assessment process. In addition to the competent authority, DFFE, key stakeholders, the local municipality as well as other potentially affected I&APs, including adjacent property owners and dwellers, are identified.

The following key stakeholders were identified for this project:

- Agri SA;
- ATNS – Cape Town International Airport;
- Birdlife South Africa;
- Breede Valley Local Municipality;
- Cape Nature;
- Central Karoo District Municipality;
- Department of Agriculture;
- Department of Environmental Affairs;
- Department of Public Works;
- Department of Transport and Public Works WC
- Eskom Transmission Limited;
- Heritage Western Cape;
- SALT – The Southern African Large Telescope;
- South African Weather Services;
- South African Astronomical Observatory;
- Telkom SA;
- WESSA;
- Air Traffic Navigation Services;
- Beaufort West Local Municipality;
- Breede Gouritz Catchment Management Agency;
- Breede Valley Municipality;
- Cape Winelands District Municipality;
- DAFF Provincial Department;
- Department of Environmental Affairs and Development Planning;
- Department of Mineral Resources;
- Department of Transport;
- Department of Water and Sanitation;
- Endangered Wildlife Trust;
- National Department of Economic Development;
- SA Civil Aviation Authority;
- SANRAL
- Sentech;
- Square Kilometre Array
- Transnet;
- Western Cape Provincial Government;

This list will be updated as the project progresses and based on responses received.

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

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

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

14.2.3 Public Participation Process completed for the Scoping Phase

The aim of the Scoping Phase was to collect the issues, concerns and queries of interested and affected parties (I&APs) and determine the scope of the following phase of the EIA. The main objective of the Scoping Phase was to:

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

The comment periods during the scoping phase were implemented according to the EIA Regulations, 2014 (as amended). The comment periods that were implemented during the scoping phase (as set out by the EIA Regulations, 2014) were as follows:

Comment and review period of the Draft Scoping Report (DSR):

- The DSR underwent a 30-day comment and review period that ran from the 14th of December 2022 until the 05th of February 2023 (excluding public holidays).
- An I&AP database was compiled which included all affected landowners, adjacent landowners, occupiers of affected and adjacent land, other I&APs, key stakeholders (such as OoS) and other surrounding projects developers. The I&AP database is included in **Appendix 5**.
- Issuing of the notifications and initial landowner consultation was circulated to all I&APs on the 14th of December 2022 as part of the Draft Scoping Report (Proof included in **Appendix 5**).

- Placement of site notices in English and Afrikaans (as per regulations) were placed along the entrance road to the application site and around the site itself on **09 December 2022** (proof included in **Appendix 5**).
- Notification letters were sent via E-mail or sms (if cellphone number / email is available, it is assuming the I&AP have an email or cellphone).
- Public notification of the Scoping process was advertised in a local newspaper (namely **Die Courier**) on **16 December 2022**, as required according to Regulation 41(2) (c) of the EIA Regulations (2014), as amended. Proof was included in the Final Scoping.

Availability of report for review:

- The draft Scoping report was made available on SiVEST's website for download.
- Electronic copies were made available to parties upon request for the documentation.
- The Draft Scoping Report was located and available for review at the following locations:
 - Beaufort West Library, 15 Church Street, Beaufort West, Western Cape, South Africa
 - Prince Albert Public Library, Church Street, Prince Albert, Western Cape.

14.2.4 Summary of issues raised

Issues, comments and concerns raised during the scoping phase public participation process have been captured in the Comments and Response Report (C&RR). The C&RR provides a summary of the comments received and issues raised by I&APs and key stakeholders, as well as the responses provided. This information has been used to feed into the evaluation of environmental and social impacts and has also been taken into consideration when compiling this report. All comments received to date have been included in the C&RR and attached in **Appendix 5**

The EAP requested for 90 days extension in the timeframe to submit the EIAR by **18 October 2023**. The competent authority granted the extension.

14.2.5 Public Participation Process to be undertaken for the EIA Phase

Public participation forms a critical component of the EIA process, as it provides all interested and affected parties with an opportunity to learn about a project, but more importantly to understand how a project will impact on them. The following was undertaken during the EIA Phase (as per the approved Final Scoping and Plan of Study):

- The I&AP database was updated as and when necessary during the execution of the EIA.
- The DEIAR underwent a 30-day comment and review period that ran from 06th September 2023 until 09th October 2023.
- All parties on the IA&P database were notified via email or sms of the opportunity to review the Draft EIA Report, the review period and the process for submitting comments on the report (proof included in Appendix 5).

- The availability of the draft report for review and comment was advertised on Die Courier newspaper on 01st September 2023.
- Issuing of the notifications was circulated to all registered I&APs on the 06 September 2023 as part of the Draft EIA Report (proof included in **Appendix 5**).
- Reminder notifications of the closing DEIR comment period were sent out on 21st September 2023, 28th September 2023, 04th October 2023 and 09th October 2023 to ensure that comments and/ or concerns were received from the OoS and /or registered I&APs.
- All comments received from I&APs and the responses thereto have been included in the final EIA Report submitted to DFFE.
- A copy of the Draft EIA Report was made available at the Beaufort West Library, 15 Church Street, Beaufort West and Prince Albert Public Library, Church Street, Prince Albert, Western Cape, South Africa
- A Comments and Response Report has been updated and included in the Final EIA Report, which records the date that issues were raised, a summary of each issue, and the response of the team to address the issue. The Final EIA report with all comments included has been submitted to DFFE for review and approval.
- All I&APs will be notified via email, sms or fax after having received written notice from DFFE on the final decision on the application. These notifications will include the process required to lodge an appeal, as well as the prescribed timeframes in which documentation should be submitted.
- As part of the CLA recommendations, additional engagement with the farm workers was undertaken as part of the PPP and included in the final report.

14.3 Impact Assessment

The potential impacts for the identified environmental aspects have been assessed and available mitigation measures identified below. The detailed impact assessments on the preliminary layouts are in the respective specialist studies (**Appendix 6**).

14.3.1 Planning

Table 24: Planning Phase

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
Aquatic / Freshwater																						
None Identified																						
Terrestrial Ecology																						
None Identified																						
Agricultural – Compliance Statement																						
None Identified																						
Avifaunal																						
None Identified																						

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
Bats																				
Turbine positions	Placing turbine positions in sensitive bat habitat	2	2	2	3	3	2	2 4	-	MED IUM	<ul style="list-style-type: none">Developer has already applied the mitigation measure of placing turbine position outside bat sensitive areas.	1	1	1	1	3	1	7	-	LOW
Heritage (Archaeology) – None identified																				
Damage to 2 sites containing burial grounds (K027 and KC001)	The graves and burial grounds are located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites	2	3	4	4	4	2	3 4	-	MED IUM	<ul style="list-style-type: none">The grave site should be demarcated with a 50m no-go- buffer-zone, and the grave should be avoided.A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs to be approved by HWC prior to construction).	2	1	4	4	4	1	1 5	-	LOW
Damage to one historical farmstead (KC001)	One historical homestead is located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	2	2	4	4	4	2	3 2	-	MED IUM	<ul style="list-style-type: none">A no-go-buffer-zone of at least 30m should be kept to the closest WEF infrastructure (incl. roads).If development occurs within 30m of KC001, the structures will need to be satisfactorily studied	2	1	4	4	4	1	1 5	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION												
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S				
											and recorded before impact occurs. <ul style="list-style-type: none">Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure.													
Damage to four historical structures (K012/1, K012/2, K012/3, K012/4)	Four structures are located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	2	2	4	4	4	2	3 2	-	MED IUM	<ul style="list-style-type: none">A no-go-buffer-zone of at least 30m should be kept to the closest WEF infrastructure (incl. roads).	2	1	4	4	4	1 5	-	LOW					
Unidentifie d heritage resources	Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	1	3	4	2	4	2	2 8	-	MED IUM	<ul style="list-style-type: none">An induction and training program on managing archaeological resources must be included in the induction programs for the Environmental Control/Site Officer working on the project.An assessment of the footprint areas must be done if the project is to commence immediately pre-construction and any	1	3	4	2	4	1 4	-	LOW					

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
											findings must be handled through the Chance finds protocol. • Implementation and training of the Chance finds program must be included.									
Heritage (Palaeontology)																				
None Identified																				
Heritage (Cultural Landscape)																				
Ecological	Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	2	4	3	3	3	4	6	-	HIGH	<ul style="list-style-type: none"> Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases as far possible. No wind turbines should be placed within the 1:100-year flood line or the no-go areas specified by the wetland specialist (where advised) of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential 	2	2	2	1	3	2	2	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											archaeological resources, it would be a risk to include any structures close to these drainage lines and specialist recommendations must be taken into account in this regard, as advised. <ul style="list-style-type: none">Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use and continued access to these resources must be maintained.Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Aesthetic	Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	2	4	4	4	3	4	68	-	VERY HIGH	<ul style="list-style-type: none"> Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines, due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape. Significant and place-making viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found 	2	3	2	3	3	3	39	-	MEDIUM

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
											<p>when travelling through the landscape or at the historic farmsteads.</p> <ul style="list-style-type: none"> • Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills, as these are important place making and orientating elements for experiencing the cultural landscape. • Prevent the construction of new buildings/structures/ new roads on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests,. • Turbine and new road placement to avoid slopes steeper than 10% with existing farm roads to be used for access to turbines where existing, and / or to be used as far as possible. The low gradient is relative to the context of the landscape, which is flat and expansive. • No-go areas on mountain ridges over 1040m asl and steep slopes over 10% for all infrastructure 									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
											(orange shading). Mountain ridgeline high sensitivity area at or below 1040m asl is for specialist approval on finalisation in EIA phase. <ul style="list-style-type: none">Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road access and upgrades, which must not impact on the views from the road. Note that 800m is a no-go turbine buffer and 200m high sensitivity buffer where turbine placement is subject to specialist approval. The WEF layout and internal roads presented in this report (22.8.23) are acceptable and have been reviewed and approved by the specialist.To support the continued occupation of the homesteads on the landscape, the turbines should be placed at a suitable distance from any occupied										

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
											<p>homestead. Amospoortjie can be graded IIIA and a 1km buffer would be minimum. For Dankbaar, the buffer can be reduced to the recommendations set by the VIA, SIA and Noise specialist reports with no less than 500m buffer. A buffer of 800m is currently recommended for Trakaskuilen for any future development.</p> <ul style="list-style-type: none"> Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m (200m no-go turbine buffer and 100m high sensitivity buffer where turbine placement is subject to specialist approval) from the farm roads still in use should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. Substation Option 1 is preferred in 									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
											terms of cultural landscape assessment as it avoids any steep slopes, the ridgeline and the CL buffers of the farm road and N12 scenic route. <ul style="list-style-type: none">Substation Option 2 is acceptable if all permanent infrastructure, other than roads, can be kept out of the N12 800m no-go buffer on final construction.The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for											

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
											farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.									
Historic	Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape.	2	4	3	4	4	4	6 8	-	VER Y HIG H	<ul style="list-style-type: none"> Due to the scenic and historic significance of the regional road, a buffer of 1000m to either side of the N12 should be maintained for no development associated with the WEF other than sensitive road upgrades, which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1000m distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance. Note that 800m is a no-go turbine buffer and 200m high sensitivity buffer where infrastructure placement is subject to specialist approval – layout proposed in this report has 	2	2	2	1	3	2	2 0	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											buffer of 50m around any outlying graded heritage structure, must be maintained, including the associated cultivated areas, cemeteries and unmarked graves, for all new infrastructure. With current recommended buffers in place these heritage resources will not be negatively impacted upon. <ul style="list-style-type: none">Due to the historic and local experience of the landscape from the farm roads, which link the historically significant farmsteads across the region, a buffer of 300m (200m no-go turbine buffer and 100m high sensitivity buffer where turbine placement is subject to specialist approval in the final layout) from the farm roads should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. The proposed placement of infrastructure as per layout shown									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<p>in CLA report dated 22.8.23 is acceptable.</p> <ul style="list-style-type: none">The existing names of places, routes, watercourses and natural features in the landscape that are related to its use, history and natural character should be retained and used as heritage resources related to intangible heritage.Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No development closer than 50m from the boundary of any burial grounds or unmarked graves. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint and any new access roads should be conducted to ensure no further									

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)
										<p>unmarked graves are threatened. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements – layout proposed in this report has been assessed and approved and any further changes will require review and approval by the specialist</p> <ul style="list-style-type: none"> Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonage came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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												promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)
	empowerment and character of the cultural landscape.									<p>possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.</p> <ul style="list-style-type: none"> The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. Local residents must be offered appropriate training and the opportunity for employment on the construction/ decommissioning 								

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
											and operational phases before 'importing' staff from elsewhere. • Local residents must be offered employment training opportunities associated with WEF developments at all phases.									
Noise																				
Noise impacts relating to planning activities	Light delivery vehicles moving around onsite for surveying	1	1	1	1	1	1	5	-	LOW	• No mitigation measures recommended for the planning stage	1	1	1	1	1	1	5	-	LOW
Transport																				
None Identified																				
Visual																				
None Identified																				
Geotech																				
None Identified																				
Wake Effect																				
None Identified																				

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL
Social																		
Demographic change impacts																		
Increased spread of disease	The spread of disease can be increased by additional individuals, e.g., contractors' staff, in the study area. As a result of a lack of previous exposure, newcomers to the area may carry respiratory disease strains to which the local population is unable to respond. There is also the possibility of increased spread of sexually transmitted diseases such as HIV/AIDS and others	Negative								<ul style="list-style-type: none">People with flu or COVID 19 should stay home. Before the project begins, all construction workers should take an HIV/AIDS awareness course. Information on general hygiene, HIV/AIDS, and STDs should be readily available.								
Increased criminal activity	During construction, there will be contractors and job seekers in the area. Contractors and employees will have to cross private property to get to the site, which could attract criminals. Contractors are not the security risk, but it is unemployed job seekers who	Negative								<ul style="list-style-type: none">All Mainstream employees and subcontractors should be easily identifiable. Mainstream and/or its contractors must work with farmers to establish access protocols for private land. Before entering affected land, landowners should be consulted. Construction sites should have security. Access to farms where construction is taking place should be controlled.								

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
	will have easier access to the site. This is, however, a low probability because there are very few landowners in the area.																			
Increased pressure on existing infrastructure and services	For either of the two projects, no construction camps will be used. The contractors will be housed in a variety of town guesthouses. The populations in the study areas are small. Contractors who stay in town may put additional strain on existing infrastructure and services. The impact on water resources may be the most important, as drought is a major issue in the area. More frequent use may also have an impact on access roads, sanitation, and waste removal.	Negative									<ul style="list-style-type: none"> Educate construction workers on the importance of conserving water resources. Ensure regular communication with the local municipalities to ensure pressure is not being exerted on local infrastructure. 									
Tension/competition between newcomer	Some of the contractor's (mostly semi- and highly skilled) employees may be from outside the DM. Locals'	Negative									<ul style="list-style-type: none"> When possible, the recruitment process should favour local job seekers. Clearly communicate the intention to hire locals first to discourage jobseekers from other areas. Involve local community structures (e.g. ward 									

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)
s and local residents/communities	perception that outsiders take jobs from unemployed locals causes tension. High unemployment in the study area increases this impact's likelihood.									councillors and/or ward committees) to help communicate and identify local labour resources.								
Impacts arising from geographical or environmental changes																		
Increased fire hazard	An increase in human presence during construction may increase the risk of veld fires. These dangers could be caused by open fires used for cooking and warmth, cigarettes, the burning of fire breaks, and the use of flammable liquids. Uncontrolled fires in project areas could cause neighbouring landowners to lose infrastructure, grazing land, crops, or livestock.	Negative								<ul style="list-style-type: none"> No open fires allowed. Construction sites and vehicles should have firefighting equipment. 								
Reduced safety in and around the project areas	Non-project workers, such as farm labourers, could wander onto the construction site and stockpiles without PPE and knowledge of the	Negative								<ul style="list-style-type: none"> The contractor should brief farmers' workers on project safety risks. If possible, fence off stockpiles. Enforce strict speed limits. All on-site and material-transporting vehicles should be roadworthy. High-danger areas should have road and warning signs. 								

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	dangers. Due to increased traffic volumes and the presence of heavy motor vehicles (HMTVs), the transportation of construction materials and machinery on roads used by private motorists poses a safety risk. however, this is unlikely due to the sparse population.																			
Site specific social sensitivie s	Property owners and land users on neighbouring properties may experience direct or indirect impacts differently. Construction causes noise and visual changes, for example. These activities could affect "Sense of place," the identity and character of a landscape felt by locals and visitors (e.g. farmer, tourists, and community members). This attribute is derived from the natural environment, a mix of natural and cultural									Negative	<ul style="list-style-type: none"> Establish communication protocols to manage Mainstream, landowners, and contractors during construction. Appropriate mitigation measures are implemented to mitigate biophysical, visual, and cultural heritage impacts, per the EIA for the proposed project. Ensure a clean site during construction and operation to reduce the project's impact on the area's character. 									

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)
	landscape features, and the people who live there.																	
Impacts arising from economic change																		
Increased employment opportunities	During construction, the project will create direct and indirect jobs. When this report was written, it wasn't known how many jobs the proposed development would create. Although limited, new employment opportunities may be significant in study areas with small populations. These are temporary, unskilled jobs (which will be available for members of local communities). The proposed project may also create indirect informal sector jobs, such as food stalls for construction workers. Due to high unemployment, any formal employment, even for a short time, will likely be beneficial.	Positive								<ul style="list-style-type: none"> Mainstream and its contractors should be required to hire locals during construction. When possible, promote labour-intensive construction. Mainstream should consult the local DOL and neighbouring businesses to see if they will share their skills registers/databases with the Project, especially if any employees have been laid off. Recruitment during the construction phase should be coordinated through the local DoL or institutions recommended by local authorities (if applicable). Recruitment procedures must be fair and transparent and follow Mainstream's labour and procurement policies. A monitoring system should ensure contractors follow local employment policy. Local contract/temporary workers should be given reference letters after construction is complete. On-the-job training should be certified. 								

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		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S
Increased opportunities for local SMEs	Local SMEs providing transport, security, accommodation, catering, etc. may have more opportunities. Such opportunities will lead to secondary multiplier effects like more employment and disposable income.	Positive									<ul style="list-style-type: none"> If subcontractors are appointed, the project should give preference to subcontractors/SMEs in the surrounding communities (Ward 1 & 6), then in the DM, and then outside the province. Construction contractors should monitor their procurement practises and prefer local suppliers. When non-local service providers are awarded contracts, contractors must show they tried to find a local provider. 									
Potential loss of revenue to tourism and ecotourism operations	The construction of the project will most likely degrade the scenery that has made the area popular among hikers, birders, and other outdoor enthusiasts. Tourism revenue generated by these visitors in the form of lodging and food may be reduced as a result of changes to the local flora and fauna and/or the visual landscape.	Negative									<ul style="list-style-type: none"> Visual and aesthetic impacts are subjective and considered most significant when the development is different from others or its surroundings. Large electrical infrastructure elements are visually intrusive. However, mitigating measures should be used. A separate flora & fauna and visual Assessment studies will determine mitigation that should be considered. 									
Unintended damages to private property	Due to vibrations and ground instability, construction equipment like heavy-duty vehicles can damage nearby properties. Abnormally	Negative									<ul style="list-style-type: none"> Close communication with farm managers. Establish protocols and/or communication channels to access farms and reduce damage. Photograph all affected private property areas. Repair any unintended damage to private property, including fences, immediately. When working between construction areas, leave farm gates as found. Once construction stops 									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	heavy vehicles can damage farm roads, fences, and gates. Littering during construction could damage farmland and harm domestic and game animals.									each day, the landowner should confirm this where practically possible. If security is compromised by unintended damage to control measures, appropriate security should be provided until repairs are made. If project activities cause damages to private property, the landowner should be notified and compensated where applicable.								

14.3.2 Construction Phase

Table 25: Construction Phase

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
Aquatic / Freshwater																			

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Impact 1: Loss of aquatic species of special concern	The construction activities will result in the disturbance of aquatic habitats that may contain listed and or protected plant or animal species. However, none of these were observed during this assessment within the buildable areas proposed.	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none">Develop and implementation of a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site, if and where possible.Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.	1	1	1	1	1	1	5	-	LOW
Impact 2: Damage or loss of riparian and alluvial systems in the	Construction could result in the loss of drainage systems that are fully functional and provide ecosystem services within the site especially where new access roads are required or road upgrades will widen any current	2	3	2	2	3	2	2 4	-	MED IUM	<ul style="list-style-type: none">All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Where roads and	1	3	2	1	2	2	1 8	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
constructio n phase	bridges or drifts. Loss can also include a functional loss, through change in vegetation type via alien encroachment for example.										crossings are upgraded, the following applies: Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles. <ul style="list-style-type: none">River levels, regardless of the current state of the river / water course, must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist prior to construction.Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use during the									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)			
										construction phase. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).											
Impact 3: Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	During construction earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. Leaks or spills from storage facilities also pose a risk and due consideration to the safe design and management of	1	3	2	2	3	3	3	-	MEDIUM	<ul style="list-style-type: none">All liquid chemicals including fuels and oil, including the BESS must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment).	1	3	2	1	2	2	1	8	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		
	the storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system										<ul style="list-style-type: none">Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel.All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.Littering and contamination associated with construction activity must be avoided through effective construction camp management; No stockpiling should take place within or near a water course. All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment is recoverable.									
Terrestrial Ecology																				
Impact 1: Loss of species of special concern	The construction activities will result in the disturbance of terrestrial habitats that contain listed and or protected plant or animal species. However, none of	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none">Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should include relocation of suitable plant species, but more	1	1	1	1	1	1	5	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)	S				
	the plant species were observed during this assessment within the buildable area										importantly protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site. <ul style="list-style-type: none">Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.													
Impact 2: Loss of terrestrial habitats – flora and vegetation	The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	2	3	2	2	3	2	2 4	-	MED IUM	<ul style="list-style-type: none">The development of a Rehabilitation and Monitoring plan prior to construction. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints.Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-	1	3	2	1	2	2	1 8	-	LOW				

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											establishment of plant cover is desirable to prevent erosion.									
Impact 3: Loss of terrestrial species - fauna	Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	2	3	2	2	3	2	24	-	MEDIUM	<ul style="list-style-type: none">Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers.ECO / EO (whichever is applicable) must be present on a daily basis to remove any reptiles such as the Karoo Padloper if present.Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr.Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals	1	3	2	1	2	2	18	-	LOW

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											from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff											
Agricultural – Compliance Statement																						
None Identified																						
Avifaunal																						
Avifauna	Displacement due to disturbance linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	1	4	2	3	1	3	3	3	-	MED IUM	<ul style="list-style-type: none">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.Measures to control noise and dust should be applied according to current best practice in the industry.	1	4	2	3	1	2	2	2	-	LOW

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Avifauna	Displacement due to habitat transformation linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	1	3	2	2	3	2	2	2	-	LOW	<ul style="list-style-type: none">Removal of vegetation must be restricted to a minimum and must be rehabilitated to its former state where possible after construction.Construction of new roads should only be considered if existing roads cannot be upgraded.The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.	1	2	2	2	3	2	2	0	-	LOW
Bats																						
Clearing and excavation of natural habitat.	The destruction of active bat roost and features that could serve as bat roosts, such as rock formations, removal of trees on site, destruction of derelict holes and fragmentation of habitat.	2	3	3	3	3	2	2	8	-	MEDIUM	<ul style="list-style-type: none">Apart from associated infrastructure, construction activities to be kept out of all high bat sensitive areas as far as possible.Rock formations should be avoided during construction as far as possible.Destruction of trees should be avoided as far as possible and in	1	2	2	2	2	1	9	-	LOW	

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										cases where trees have to be destroyed, care should be taken not to destroy bat roosts. <ul style="list-style-type: none"> Care should be taken if any dense bushes are destroyed so that no roosts are disturbed or destroyed. Aardvark holes or any large derelict holes or excavations should not be destroyed before careful examination for bats. The Environmental Control Officer (ECO), or a responsible appointed person, should contact a bat specialist before construction commences so that they know what to look out for during construction. 								
Creating features which attract bats	Creating new habitat amongst turbines which might attract bats. This includes buildings with roofs that could serve as roosting space and open water sources, such as quarries or excavation areas, where water could accumulate.	2	3	2	2	3	2	24	-	<ul style="list-style-type: none"> Completely seal off roofs of new buildings (e.g., substations and site buildings). Note, a small bat species could enter a hole the size of 1 cm2. Roofs need to be regularly inspected during the lifetime of the proposed WEF, and any new holes need to be sealed. 	1	1	1	1	1	1	5	-

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											<ul style="list-style-type: none">Excavation areas, quarries or any other artificial depressions should be filled and rehabilitated to avoid creating new areas of open water sources which could attract bats during rainy spells.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													</

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Heritage (Palaeontology)																				
Fossil heritage resources	Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	1	3	4	2	4	2	2 8	-	MED IUM	<ul style="list-style-type: none">Immediate assessment of footprint areas before construction by palaeontologistImplementation of Chance finds protocol	1	2	4	2	4	1 3	-	LOW	
Heritage (Cultural Landscape)																				
Ecological	Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	2	4	3	3	4	3	4 8	-	HIG H	<ul style="list-style-type: none">Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases as far as possible.No wind turbines should be placed within the 1:100-year flood line of the watercourses, unless otherwise advised by the aquatic specialist. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. This	2	2	2	1	4	2	2 2	-	LOW

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											recommendation can be waived if the archaeological or hydrological/ aquatic specialist reports recommend different buffers. <ul style="list-style-type: none">• Remaining areas of endemic and endangered natural vegetation should be conserved in line with relevant specialist buffers.• Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases as far as possible in line with relevant ecological and aquatic specialist recommended buffers.• Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost.										

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											<ul style="list-style-type: none">Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use.Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.									

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Aesthetic	WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	2	4	3	3	3	4	60	-	HIGH	<ul style="list-style-type: none">Encourage mitigation measures (for instance use of vegetation) to ‘embed’ or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc;The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and exacerbates the foreign intrusion on the natural matte landscape.Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site.The local material such as the rocks found within the area could be applied to address storm	2	4	2	2	2	2	24	-	MEDIUM

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											water runoff from the road to prevent erosion. <ul style="list-style-type: none">Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.												
Historic	Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	2	4	4	3	4	4	68	-	VERY HIGH	<ul style="list-style-type: none">Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to any outlying graded heritage structure, which includes the	2	2	3	2	2	2	22	-	LOW			

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											associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

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										<p>operate at speeds that reduce dust and noise as far possible.</p> <ul style="list-style-type: none"> Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m 								

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											around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained. <ul style="list-style-type: none">Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and a buffer of 50m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements.									

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										<ul style="list-style-type: none"> Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. Roads running through the area have historic stone way markers. Where these are found, care should be taken that they are left intact and in place. Road upgrades and or new roads must not move or threaten their position and they should be visible from the road they are related to by passing travellers. Final buffers for stone markers 								

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											will be for identification and mitigation in collaboration with the ECO prior to construction and with the approval by the heritage specialist. <ul style="list-style-type: none">Where the historic function of a building/site is still intact, the function has heritage value and should be protected.Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Kraaltjies should be maintained and integrity as a communal road for farm residents must be retained.									

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Socio- econo mic	Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	2	3	4	4	4	4	6 8	-	VER Y HIG H	<ul style="list-style-type: none"> An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including 	1	3	3	1	3	2	2 2	+	LOW

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										<div>financially, and not degrade this continued relationship.</div> <div><div><div></div></div><div>The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented.</div><div><div></div></div><div>Local residents must be offered appropriate training and the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.</div><div><div></div></div><div>Local residents must be offered employment training opportunities associated with</div></div>								

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											WEF developments at all phases. <ul style="list-style-type: none">• Sheep, cattle or game farming should be allowed to continue below the wind turbines or be rehabilitated to increase biodiversity in the area.									
Noise																				
Noise impacts during the day	Construction activities relating to the development of access roads (construction of new roads and upgrading of existing roads).	1	1	1	2	1	3	18	-	LOW	<ul style="list-style-type: none">• No mitigation measures recommended for the construction of or upgrading of access roads	1	1	1	2	1	3	18	-	LOW
Noise impacts during the day	Construction traffic using access roads in vicinity of NSR.	1	1	1	2	2	3	21	-	LOW	<ul style="list-style-type: none">• No mitigation measures necessary for construction traffic using access roads	1	1	1	2	2	3	21	-	LOW
Noise impacts during the day	Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	1	1	1	2	2	4	28	-	MEDIUM	<ul style="list-style-type: none">• Applicant to discuss the projected construction noise levels with NSR, highlighting that while noises will be clearly audible when activities are taking place within 2,000m from NSR, that measures will be implemented to minimise the	2	1	1	2	1	1	7	-	LOW

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											potential impact on their quality of life; <ul style="list-style-type: none">The Applicant to minimize night-time activities when working within 2,000m from any structure used for residential purposes where possible. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when working at night within 2,000m from NSR used for residential purposes);The applicant must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period.											
Noise impacts at night	Construction activities relating to civil works as well as erection of wind turbines	2	3	1	3	2	4	4	4	-	MEDIUM	<ul style="list-style-type: none">Applicant to discuss the projected construction noise levels with NSR, highlighting that while noises will be clearly audible when activities are taking place within 2,000m from NSR, that measures will be implemented to minimise the	2	1	1	3	1	2	1	6	-	LOW

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											potential impact on their quality of life; <ul style="list-style-type: none">The Applicant to minimize night-time activities when working within 2,000m from any structure used for residential purposes where possible. Work should only take place at one WTG location to minimize potential night-time cumulative noises (when working at night within 2,000m from NSR used for residential purposes);The applicant must notify the NSR when night-time activities will be taking place within 1,000m from the NSR; andThe applicant must plan the completion of noisiest activities (such a pile driving, rock breaking and excavation) during the daytime period (even though it is expected that it is highly unlikely that this may take place at night).									

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Transport																				
Additional Traffic Gener ation	Increase in Traffic	2	4	1	2	1	3	3	-	MED IUM	<ul style="list-style-type: none">Ensure staff transport is done in the 'off peak' periods and by bus as far as practically possible.Stagger material, component and abnormal loads delivery as far as practically possible.Construction of an on-site batching plant and tower construction to reduce trips, where required and if practically possible.	2	4	1	2	1	2	2	-	LOW
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	2	-	MED IUM	<ul style="list-style-type: none">Upgrade of existing / new access pointsReduction in speed of vehiclesAdequate enforcement of the lawImplementation of pedestrian safety initiativesRegular maintenance of farm fences & access cattle grids where and if required.Construction of an on-site batching plant and tower construction to reduce trips	2	3	2	4	1	1	1	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
											where required and if practically possible.									
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	LOW	<ul style="list-style-type: none">• Upgrade of existing / new access point• Reduction in speed of the vehicles• Construction of gravel roads in terms of TRH20• Implement a road maintenance program under the auspices of the respective transport department.• Possible use of approved dust suppressant techniques, where required and if practically possible.• Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible.	2	3	2	2	1	2	20	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
	Increase in Road Maintenance	2	3	2	2	2	2	2	-	2	LOW	<ul style="list-style-type: none">Implement a road maintenance program under the auspices of the respective transport department.Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible.	2	3	2	2	1	2	9	-	LOW	
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	1	LOW	<ul style="list-style-type: none">Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery as far as practically possible.Adequate enforcement of the law	3	2	1	2	1	1	9	-	LOW	
Internal Access Road	Increase in Dust from gravel roads	1	4	1	1	1	2	1	-	6	LOW	<ul style="list-style-type: none">Enforce a maximum speed limit on the development.Appropriate, timely and high-quality maintenance required in terms of TRH20.Possible use of an approved dust suppressant techniques, where required and if practically possible.	1	3	1	1	1	2	1	-	4	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		
	New / Larger Access points	1	4	1	2	1	1	9	-	LOW	<ul style="list-style-type: none">Adequate road signage according to the SARTSM.Approval from the respective roads department	1	4	1	2	1	1	9	-	LOW		
Visual																						
Potential alteratio n of the visual characte r and sense of place Potential visual impact on receptor s in the study area	<ul style="list-style-type: none">Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction.Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative	2	3	1	2	1	2	1	8	-	LOW	<ul style="list-style-type: none">Carefully plan to minimise the construction period and avoid construction delays.Inform receptors within 1km of the WEF development area of the construction programme and schedules.Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.Vegetation clearing should take place in a phased manner as far as practically possible.Maintain a neat construction site by removing rubble and waste materials regularly.Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.Where possible, underground cabling should be utilised.	2	2	1	2	1	2	1	6	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
	<p>sentiments from surrounding viewers.</p> <ul style="list-style-type: none">Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.										<ul style="list-style-type: none">Make use of existing gravel access roads where possible.Limit the number of vehicles and trucks travelling to and from the construction site, where possible.Ensure that dust suppression techniques are implemented: on all access roads; in all areas where vegetation clearing has taken place; on all soil stockpiles.													
Geotech																								
Disturbanc e/ displaceme	Ground disturbance during access road construction, foundation earthworks, platform	1	4	3	2	3	1	13	-	LOW	<ul style="list-style-type: none">Design access roads and turbine locations (including crane pads) to minimise earthworks and levelling based on high	1	3	2	1	3	1	10	-	LOW				

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION														
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
nt/ removal of soil and rock	earthworks										resolution ground contour information <ul style="list-style-type: none">Correct topsoil and spoil managementMaterials utilisation to minimise opening of borrow pits or creation of spoil														
Soil Erosion	Increased erosion due to vegetation clearing, alteration of natural drainage	1	3	3	2	2	1	1	1	-	LOW	<ul style="list-style-type: none">Avoid development in preferential drainage pathsAppropriate engineering design of road drainage and watercourse crossingsTemporary berms and drainage channels to divert surface runoff where neededLandscape and rehabilitate disturbed areas timeously (e.g. revegetation)Use designated access and laydown areas only to minimise disturbance to surrounding areas	1	2	1	1	2	1	7	-	LOW				
Wake Effect																									
None Identified																									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL
Social																		
Demographic change impacts																		
Increased spread of disease	The spread of disease can be increased by additional individuals, e.g. contractors' staff, in the study area. As a result of a lack of previous exposure, newcomers to the area may carry respiratory disease strains to which the local population is unable to respond. There is also the possibility of increased spread of sexually transmitted diseases such as HIV/AIDS and others	Negative								<ul style="list-style-type: none">People with flu or COVID 19 should stay home. Before the project begins, all construction workers should take an HIV/AIDS awareness course. Information on general hygiene, HIV/AIDS, and STDs should be readily available.								
Increased criminal activity	During construction, there will be contractors and job seekers in the area. Contractors and employees will have to cross private property to get to the site, which could attract criminals. Contractors are not the security risk, but it is unemployed job seekers who	Negative								<ul style="list-style-type: none">All Mainstream employees and subcontractors should be easily identifiable. Mainstream and/or its contractors must work with farmers to establish access protocols for private land. Before entering affected land, landowners should be consulted. Construction sites should have security. Access to farms where construction is taking place should be controlled.								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	will have easier access to the site. This is, however, a low probability because there are very few landowners in the area.																	
Increased pressure on existing infrastructure and services	For either of the two projects, no construction camps will be used. The contractors will be housed in a variety of town guesthouses. The populations in the study areas are small. Contractors who stay in town may put additional strain on existing infrastructure and services. The impact on water resources may be the most important, as drought is a major issue in the area. More frequent use may also have an impact on access roads, sanitation, and waste removal.	Negative								<ul style="list-style-type: none"> Educate construction workers on the importance of conserving water resources. Ensure regular communication with the local municipalities to ensure pressure is not being exerted on local infrastructure. 								
Tension/competition between newcomer	Some of the contractor's (mostly semi- and highly skilled) employees may be from outside the DM. Locals'	Negative								<ul style="list-style-type: none"> When possible, the recruitment process should favour local job seekers. Clearly communicate the intention to hire locals first to discourage jobseekers from other areas. Involve local community structures (e.g. ward 								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
s and local residents/communities	perception that outsiders take jobs from unemployed locals causes tension. High unemployment in the study area increases this impact's likelihood.									councillors and/or ward committees) to help communicate and identify local labour resources.								
Impacts arising from geographical or environmental changes																		
Increased fire hazard	An increase in human presence during construction may increase the risk of veld fires. These dangers could be caused by open fires used for cooking and warmth, cigarettes, the burning of fire breaks, and the use of flammable liquids. Uncontrolled fires in project areas could cause neighbouring landowners to lose infrastructure, grazing land, crops, or livestock.	Negative								<ul style="list-style-type: none"> No open fires allowed. Construction sites and vehicles should have firefighting equipment. 								
Reduced safety in and around the project areas	Non-project workers, such as farm labourers, could wander onto the construction site and stockpiles without PPE and knowledge of the	Negative								<ul style="list-style-type: none"> The contractor should brief farmers' workers on project safety risks. If possible, fence off stockpiles. Enforce strict speed limits. All on-site and material-transporting vehicles should be roadworthy. High-danger areas should have road and warning signs. 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL
	dangers. Due to increased traffic volumes and the presence of heavy motor vehicles (HMTVs), the transportation of construction materials and machinery on roads used by private motorists poses a safety risk. however, this is unlikely due to the sparse population.																	
Site specific social sensitivie s	Property owners and land users on neighbouring properties may experience direct or indirect impacts differently. Construction causes noise and visual changes, for example. These activities could affect "Sense of place," the identity and character of a landscape felt by locals and visitors (e.g. farmer, tourists, and community members). This attribute is derived from the natural environment, a mix of natural and cultural	Negative								<ul style="list-style-type: none">Establish communication protocols to manage Mainstream, landowners, and contractors during construction. Appropriate mitigation measures are implemented to mitigate biophysical, visual, and cultural heritage impacts, per the EIA for the proposed project. Ensure a clean site during construction and operation to reduce the project's impact on the area's character.								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	landscape features, and the people who live there.																	
Impacts arising from economic change																		
Increased employment opportunities	During construction, the project will create direct and indirect jobs. When this report was written, it wasn't known how many jobs the proposed development would create. Although limited, new employment opportunities may be significant in study areas with small populations. These are temporary, unskilled jobs (which will be available for members of local communities). The proposed project may also create indirect informal sector jobs, such as food stalls for construction workers. Due to high unemployment, any formal employment, even for a short time, will likely be beneficial.	Positive								<ul style="list-style-type: none"> Mainstream and its contractors should be required to hire locals during construction. When possible, promote labour-intensive construction. Mainstream should consult the local DOL and neighbouring businesses to see if they will share their skills registers/databases with the Project, especially if any employees have been laid off. Recruitment during the construction phase should be coordinated through the local DoL or institutions recommended by local authorities (if applicable). Recruitment procedures must be fair and transparent and follow Mainstream's labour and procurement policies. A monitoring system should ensure contractors follow local employment policy. Local contract/temporary workers should be given reference letters after construction is complete. On-the-job training should be certified. 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
Increased opportuniti es for local SMEs	Local SMEs providing transport, security, accommodation, catering, etc. may have more opportunities. Such opportunities will lead to secondary multiplier effects like more employment and disposable income.	Positive								<ul style="list-style-type: none"> If subcontractors are appointed, the project should give preference to subcontractors/SMEs in the surrounding communities (Ward 1 & 6), then in the DM, and then outside the province. Construction contractors should monitor their procurement practises and prefer local suppliers. When non-local service providers are awarded contracts, contractors must show they tried to find a local provider. 								
Potential loss of revenue to tourism and ecotourism operations	The construction of the project will most likely degrade the scenery that has made the area popular among hikers, birders, and other outdoor enthusiasts. Tourism revenue generated by these visitors in the form of lodging and food may be reduced as a result of changes to the local flora and fauna and/or the visual landscape.	Negative								<ul style="list-style-type: none"> Visual and aesthetic impacts are subjective and considered most significant when the development is different from others or its surroundings. Large electrical infrastructure elements are visually intrusive. However, mitigating measures should be used. A separate flora & fauna and visual Assessment studies will determine mitigation that should be considered. 								
Unintende d damages to private property	Due to vibrations and ground instability, construction equipment like heavy-duty vehicles can damage nearby properties. Abnormally	Negative								<ul style="list-style-type: none"> Close communication with farm managers. Establish protocols and/or communication channels to access farms and reduce damage. Photograph all affected private property areas. Repair any unintended damage to private property, including fences, immediately. When working between construction areas, leave farm gates as found. Once construction stops 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	heavy vehicles can damage farm roads, fences, and gates. Littering during construction could damage farmland and harm domestic and game animals.									each day, the landowner should confirm this where practically possible. If security is compromised by unintended damage to control measures, appropriate security should be provided until repairs are made. If project activities cause damages to private property, the landowner should be notified and compensated where applicable.								

14.3.3 Operational Phase

Table 26: Operational Phase

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
Aquatic / Freshwater																			

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		
Impact 4 Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase	Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems, which are currently ephemeral. This then increases the rate of erosion and sedimentation of downstream areas.	2	3	2	2	3	3	3	6	-	MED IUM	<ul style="list-style-type: none">A detailed stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks as and where necessary.	1	1	1	1	1	1	5	-	LOW	
Terrestrial Ecology																						
Impact 4: Loss of terrestrial	Although most of the species observed are mobile, the increase in vehicle	2	3	2	2	3	2	2	4	-	MED IUM	<ul style="list-style-type: none">Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint	1	3	2	1	2	2	1	8	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S	
species - fauna	movement could result in an increase in road mortalities.										of the WEF to ensure that there is no uncontrolled access by construction vehicles and labourers; <ul style="list-style-type: none">Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr;Mitigating the risk of poaching by fencing in the accommodation compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.										
Agricultural – Compliance Statement																					
None Identified																					
Avifaunal																					

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
Avifauna	Mortality of priority species due to collisions with the wind turbines.	2	3	2	3	3	3	9	-	MED IUM	<ul style="list-style-type: none"> No turbines should be located in the buffer zones around major drainage lines, waterpoints and dams. A 5km circular No-Go (no turbines) buffer zone must be implemented around the Martial Eagle nest on Tower 108 of the Droërvier Proteus 1 – 400kV transmission line. 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. If estimated annual collision rates indicate unacceptable mortality levels of priority species, i.e., if it exceeds the mortality threshold determined by the avifaunal specialist after consultation with other avifaunal specialists and BirdLife South Africa, additional measures will 	2	2	2	2	3	2	2	2	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											have to be implemented which could include shut down on demand or other proven recommended measures.									
Avifauna	Mortality of priority species due to electrocutions on the overhead sections of the internal 11-33kV cables.	2	3	1	3	3	2	24	-		<ul style="list-style-type: none">Underground cabling should be used as much as is practically possible.If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures e.g., insulation of live components to prevent electrocutions on terminal structures and pole transformers.Regular inspections of the overhead sections of the internal reticulation network must be conducted during the operational phase to look for carcasses, as per the most recent edition of the	2	2	1	2	3	1	10	-	

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)	S
											Best Practice Guidelines at the time (Jenkins et al. 2015).									
Avifauna	Mortality due to collisions with the overhead sections of the internal 11-33kV cables.	2	3	2	3	3	2	26	-	MEDIUM	<ul style="list-style-type: none">Bird flight diverters should be installed on all the overhead line sections for the full span length according to the applicable Eskom standard. These devices must be installed as soon as the conductors are strung.	2	1	1	2	3	1	9	-	LOW
Avifauna	Mortality due to collisions with the overhead sections of the internal 11-33kV cables.	2	3	2	3	3	2	26	-	MEDIUM	<ul style="list-style-type: none">Bird flight diverters should be installed on all the overhead line sections for the full span length according to the applicable Eskom standard. These devices must be installed as soon as the conductors are strung.	2	1	1	2	3	1	9	-	LOW
Bats																				
Direct collision or barotrauma	Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades	3	4	3	4	3	3	51	-	HIGH	<ul style="list-style-type: none">All turbines and turbine components, including the rotor swept zone, should be kept out of all high sensitivity zones.	2	4	3	3	3	2	30	-	MEDIUM

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying (high risk) species have predominantly been confirmed at the proposed Kraaltjies WEF site.									<ul style="list-style-type: none"> Mitigation, as proposed in Section 9, should be applied as soon as the test period of turbines are completed and turbines start turning. A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period. 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<ul style="list-style-type: none">• Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.• Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.• Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.• Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S			
											off when not in operation, as possible. <ul style="list-style-type: none">It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Kraaltjies WEF. Therefore, the installation of more than one monitoring system at height, is advised.												
Fatality of migratory bats	Bat fatality during migration. Limited activity by <i>Miniopterus natalensis</i> , a Near Threatened migration species, had been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species	3	4	2	3	3	3	4 5	-	HIGH	<ul style="list-style-type: none">Care should be taken during post construction monitoring to verify the activity of <i>M. natalensis</i>, especially within the rotor swept area of the turbine blades. Carcasses should be identified to establish the fatality of this species.A bat specialist should be appointed before the turbines	3	3	3	2	3	2 8	-	MEDIUM				

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	occurring on site could also migrate.										start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines. <ul style="list-style-type: none">At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.Mitigation should be discussed between the bat specialist and									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, of turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions. <ul style="list-style-type: none">• Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.• Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.• It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
											deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Kraaltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.													
Loss of bats of conservation value	Bat fatality of bat species of conservation value. Calls similar to the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	3	4	2	3	3	3	45	-	HIGH	<ul style="list-style-type: none">Loss of bats of conservation value. Activity indicating the red data <i>Miniopterus natalensis</i> has been recorded, as well as the endemic <i>E. hottentotus</i>. Proven mitigation measures, such as curtailment, should be timeously applied if high activity of bats of conservation value is recorded, or if high numbers of carcasses are collected, during post-construction.A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or	3	3	3	2	3	2	28	-	MEDIUM				

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											described by the latest South African bat guidelines. <ul style="list-style-type: none">At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist.Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs,									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S	
											turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions. <ul style="list-style-type: none">• Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.• Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.• It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting										

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											future bat fatality records of the proposed Kraaltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.									
Fatal curiosity	Bat mortality due to the attraction of bats to wind turbines. Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	2	2	2	2	3	2	2 2	-	LOW	<ul style="list-style-type: none">Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.Little is known about this impact, and mitigation could be adapted if more research becomes available.	2	2	1	2	2	1	9	-	LOW
Habitat Loss	Loss of habitat and foraging space during operation of the wind turbines.	2	4	3	3	3	3	4 5	-	HIGH	<ul style="list-style-type: none">All turbines and turbine components, including the rotor swept zone, should be kept out of all high sensitivity zones.Mitigation, as proposed in Section 9, should be applied as soon as the test period of turbines are completed and turbines start turning.	2	4	2	2	3	2	2 6	-	MEDIUM

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<ul style="list-style-type: none"> At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period. Prolonged post-construction mitigation, beyond the prescribed two years, might be necessary if advised by the operational bat specialist. Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, turbine specific mitigation measures should be applied, 								

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										using Section 9 as a starting point for discussions. <ul style="list-style-type: none">• Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.• Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.• It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Kraaltjies WEF.								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											Therefore, the installation of more than one monitoring system at height, is important.									
Smaller genetic pool	Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	3	3	2	2	3	2	26	-		<ul style="list-style-type: none">A bat specialist should be appointed before the turbines start to turn, and operational bat monitoring should start when all the turbines start to turn, for a minimum of two years, or described by the latest South African bat guidelines.At least two years of post-construction bat monitoring is to be conducted and must be performed according to the South Africa Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy facilities (Aronson, et.al., 2020), or later versions of the guidelines valid at the time of monitoring, as well as other relevant SABAA guidelines as applicable during the monitoring period.Prolonged post-construction mitigation, beyond the	3	2	2	2	3	2	24	-	MEDIUM

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											prescribed two years, might be necessary if advised by the operational bat specialist. <ul style="list-style-type: none">Mitigation should be discussed between the bat specialist and developer during the operational phase and should be adapted and implemented without delay. Where high bat mortality occurs, turbine specific mitigation measures should be applied, using Section 9 as a starting point for discussions.Freewheeling, when turbines do not generate power, should be avoided, to a point where the turbines are not a threat to bats.Except for compulsory lighting required in terms of civil aviation, artificial lighting should be minimised, especially bright lights. Lights should rather be turned downwards. Turbine tower lights should be switched off when not in operation, if possible.									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
											<ul style="list-style-type: none">It is understood that static bat monitoring equipment on turbines has a cost implication. Although it is not a requirement at this stage, as it depends on whether the Met mast will be deployed for the life span of the turbines. Having refined static data from sampling points at height, would aid in interpreting future bat fatality records of the proposed Kraaltjies WEF. Therefore, the installation of more than one monitoring system at height, is important.													
Heritage (Archaeology)																								
None identified																								
Heritage (Palaeontology)																								
None identified																								
Heritage (Cultural Landscape)																								
Ecological	Inappropriate operational activities degrade the significant ecological	1	4	4	2	3	4	5	-	HIGH	<ul style="list-style-type: none">Areas of endemic and endangered natural vegetation should be conserved.	1	1	4	2	3	2	2	-	LOW				

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S					
	elements of the cultural landscape											<ul style="list-style-type: none">Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), including manmade wetlands and dams, should be protected as far possible.Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed.Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. Access to these resources should be made available to those who have had historic access to them.													
Aesthetic	Inappropriate operational activities degrade the significant aesthetic elements of the cultural	2	4	3	3	4	3	4	8	-	HIGH	<ul style="list-style-type: none">Infrastructure improvement or maintenance work, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.) and avoid	2	4	3	3	4	2	3	2	-		MEDIUM		

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	landscape altering the character and sense of place										steep slopes over 10% as well as ridges. <ul style="list-style-type: none">Prevent the construction of new buildings/structures on visually sensitive, steep (over 10%), elevated or exposed slopes, ridgelines and hillcrests or within farmstead and N12 buffers and 300m of the regional farm roads.Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads.Duration and magnitude of operational activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm										

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<p>roads. Operational traffic must operate at speeds that reduce dust and noise as far possible.</p> <ul style="list-style-type: none"> The impact of WEF turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis. 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
Historic	Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	2	4	4	4	4	4	7 2	-	VER Y HIG H	<ul style="list-style-type: none">Historic farmsteads must be protected from the impacts of operational facility vehicles and increased numbers of people. No WEF operations traffic should pass within 50m from any outlying graded structures, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel	2	2	4	2	4	2	2 8	-	MEDIUM

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<p>routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained.</p> <ul style="list-style-type: none"> Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged and a buffer of 50m around any burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
											not associated with other heritage features or cultural landscape elements. <ul style="list-style-type: none">Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.Roads running through the area may have historic stone way markers. Where these are found care should be taken that they are left intact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing										

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										travellers. <ul style="list-style-type: none"> Where the historic function of a building/site is still intact, the function has heritage value and should be protected. Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running through Kraaltjies should be maintained and integrity as a communal road for farm residents must be retained. Accommodation of WEF staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or 								

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												aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
											long term economic benefit and local employment opportunities must be prevented. <ul style="list-style-type: none">The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including financially, and not degrade this continued relationship.Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.Local residents must be offered employment training opportunities associated with									

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											WEF developments at all phases. <ul style="list-style-type: none">Crop cultivation, sheep, cattle or game farming should be allowed to continue below the wind turbines or be rehabilitated to increase biodiversity in the area.									
Noise																				
Noise impacts during the day	Noises from operating wind turbines	1	2	1	2	3	4	36	-	MEDIUM	<ul style="list-style-type: none">No mitigation measures recommended for daytime operational activities	1	1	1	1	3	3	21	-	LOW
Noise impacts at night	Noises from operating wind turbines	2	4	1	2	3	4	48	-	HIGH	<ul style="list-style-type: none">The applicant can select a WTG with a lower SPL (e.g., a WTG with a SPL less than 106.5 dBA re 1 pw)The layout can be changed to locate WTG further from NSR, considering the potential cumulative effect of all WTG located within 2,500 m from NSR. For the currently layout, noise levels less than 45 may be possible when relocating WTG T9, T12 and T28 further than 2,500m from all verified NSR; or	2	2	1	3	3	2	22	-	LOW

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												<ul style="list-style-type: none">The applicant can develop a noise abatement program to reduce the noise emission levels (the applicant must select an WTG that offer a reduced noise emission mode during the planning stage) at certain wind speeds, and/or if the wind blows in a certain direction for a number of WTG (WTG within approximately 2,500m from NSR). The applicant should consider the potential reduction in power generation capacity of WTG operating in a reduced noise mode.													
Transport																									
Additional Traffic Generation	Increase in Traffic	2	1	1	2	3	1	9	-	LOW	<ul style="list-style-type: none">The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	LOW					
	Increase of Incidents with pedestrians and livestock	2	1	1	2	3	1	9	-	LOW	<ul style="list-style-type: none">The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	LOW					

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	Increase in Dust from gravel roads	2	1	1	2	3	1	9	-	LOW	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	LOW
	Increase in Road Maintenance	2	1	1	2	3	1	9	-	LOW	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	2	1	1	2	3	1	9	-	LOW
Abnormal Loads	Additional Abnormal Loads	3	1	1	2	3	1	10	-	LOW	• The increase in traffic for this phase of the development is negligible and will not have a significant impact	3	1	1	2	3	1	10	-	LOW
Internal Access Road	New / Larger Access points	1	1	1	2	3	1	8	-	LOW	• Adequate road signage according to the SARTSM	1	1	1	2	3	1	8	-	LOW
Visual																				

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
<ul style="list-style-type: none">▪ Potential alteration of the visual character and sense of place.▪ Potential visual impact on receptors in the study area.Potential visual impact on the night time visual environment.	<ul style="list-style-type: none">• The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.• The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.• Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.• The night time visual environment will be	2	3	3	3	3	2	2	8	-	MEDIUM	<ul style="list-style-type: none">• Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum.• Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011).• If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact.• As far as possible, limit the number of maintenance vehicles which are allowed to access the site.• Ensure that dust suppression techniques are implemented on all gravel internal access roads.• As far as possible, limit the amount of security and	2	3	3	2	2	2	2	4	-	MEDIUM

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	<p>altered as a result of operational and security lighting at the proposed WEF.</p> <ul style="list-style-type: none"> Shadow flicker impacts may affect residents within 800m of a turbine placement. 									<p>operational lighting present on site.</p> <ul style="list-style-type: none"> Light fittings for security at night should reflect the light toward the ground and prevent light spill. Lighting fixtures should make use of minimum lumen or wattage. Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. If possible, make use of motion detectors on security lighting. Where an occupied building is located within 800m of a wind turbine, then the potential for shadow flicker should be assessed. Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		
											<ul style="list-style-type: none">The operations and maintenance (O&M) buildings should not be illuminated externally at night.The O&M buildings should be painted in natural tones that fit with the surrounding environment.											
Geotech																						
Soil Erosion	Increased erosion due to alteration of natural drainage	1	2	1	1	3	1	7	-	LOW	<ul style="list-style-type: none">1) Maintain drainage channels2) Monitor for erosion and remediate and rehabilitate timeously	1	1	1	1	2	1	6	-	LOW		
Wake Effect																						
Wind energy resource	Wake impact on planned neighbouring wind farms	2	4	1	1	3	2	2	2	-	LOW	<ul style="list-style-type: none">Enter into wake compensation discussions with any neighbouring operational and / or wind farm projects that have reached financial close and are going into construction with the intent to sign an agreement prior	2	4	1	1	3	1	1	1	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										to the proposed wind farm having impact on operational/in-construction projects and where both parties agree.								
Social																		
Impacts arising from economic change																		
Increased socio-economic development associated with more available electricity	the WEF when completed provides part of the solutions for the current electricity shortages and the increasing demand for energy, as well as the need to find more sustainable and environmentally friendly energy resources. The additional clean energy can contribute to sustainable socio-economic development in South Africa.	Positive								<ul style="list-style-type: none"> Engage government planning departments to prioritise households with electricity backlogs. Continuous communication with municipal and district spatial planning departments. 								
Reduced property values	The proposed WEF may lower farm property values directly and indirectly. This may be due to the WEF's appearance and	Negative								<ul style="list-style-type: none"> In the event of property prices being significantly reduced, affected landowners should be consulted with regard to the value of compensation. Mainstream must ensure that the value of compensation is agreed by all parties. 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	infrastructure within the natural environment. It also hinders the owner's ability to market the land for hiking, bird watching, and other activities.																			
Unintende d damages to private property	Littering may occur during maintenance, which could damage farmland or harm domestic and game animals. Farm gates may be left open, allowing animals to escape. Stray animals are valuable assets and rounding them up is inconvenient and may stress the animals.									Negative										<ul style="list-style-type: none"> Mitigation to be applied as described in the construction phase.
Impacts arising from geographical or environmental changes																				
Site specific social sensitivitie s	Similarly, to the impact described earlier, property owners and land users on surrounding properties may experience direct or indirect impacts differently on their specific properties during the operational phase as well, Therefore, the following									Negative										<ul style="list-style-type: none"> Mitigation to be applied as described in the construction phase.

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	impacts on surrounding landowners need to be taken into account																	

14.3.4 Decommissioning Phase

Table 27: Decommissioning Phase

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)	S
Aquatic / Freshwater - Same as construction																				
Impact 1: Loss of aquatic species of	The construction activities will result in the disturbance of aquatic habitats that may contain listed and or	1	1	1	1	1	1	5	-	LOW	• Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should	1	1	1	1	1	1	5	-	LOW

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
special concern	protected plant or animal species. However, none of these were observed during this assessment within the buildable areas proposed.									include relocation of suitable plant species, but more important protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site, if and where possible. • Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re-establishment of plant cover is desirable to prevent erosion.								
Impact 2: Damage or loss of riparian and alluvial systems in the construction phase	Construction could result in the loss of drainage systems that are fully functional and provide ecosystem services within the site especially where new access roads are required or road upgrades will widen any current bridges or drifts. Loss can also include a functional loss, through change in vegetation type via	2	3	2	2	3	2	24	-	• Development of a detailed stormwater management plan and Aquatic Rehabilitation and Monitoring plan, prior to construction. • All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed	1	3	2	1	2	2	18	-

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	alien encroachment for example.									<p>crossings. Where roads and crossings are upgraded, the following applies: Existing pipe culverts must be removed and replaced with suitable sized box culverts, especially where road levels are raised to accommodate any large vehicles.</p> <ul style="list-style-type: none"> River levels, regardless of the current state of the river / water course, must be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist prior to construction. <p>Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.</p> <ul style="list-style-type: none"> Suitable stormwater management systems must be installed along roads and other areas and monitored during the 								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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											first few months of use during the construction phase. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S
ioning phases	consideration to the safe design and management of the storage facility must be given. Although unlikely, consideration must also be provided for the proposed Battery Energy Storage System (BESS), with regard safe handling during the construction phase. This to avoid any spills or leaks from this system										ponds (to capture oils, grease cement and sediment). <ul style="list-style-type: none">Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel.All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses.Littering and contamination associated with construction activity must be avoided through effective construction camp management; No stockpiling should take place within or near a water course. All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment is recoverable.									
Terrestrial Ecology - Same as construction																				
Impact 1: Loss of species of	The construction activities will result in the disturbance of terrestrial habitats that contain listed and or	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none">Develop and implement a Rehabilitation and Monitoring plan post Environmental Authorisation. This plan should	1	1	1	1	1	1	5	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
special concern	protected plant or animal species. However, none of the plant species were observed during this assessment within the buildable area										include relocation of suitable plant species, but more importantly protect any topsoil stores and promote the collection of vegetative material and propagules / seed to assist with the revegetation of the site. • Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto areas where the re- establishment of plant cover is desirable to prevent erosion.											
Impact 2: Loss of terrestrial habitats – flora and vegetation	The construction of the proposed infrastructure will require the need to clear vegetation which could then have a secondary impact on ecological connectivity and especially Critical Biodiversity Areas, linked to the large riverine corridors.	2	3	2	2	3	2	24	-	MED IUM	• The development of a Rehabilitation and Monitoring plan prior to construction. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints. • Rapid regeneration of plant cover must be encouraged by setting aside topsoil during earthmoving and replacing onto	1	3	2	1	2	2	18	-	LOW		

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											areas where the re- establishment of plant cover is desirable to prevent erosion.									
Impact 3: Loss of terrestrial species - fauna	Although most of the species observed are mobile, the increase in vehicle movement could result in an increase in road mortalities.	2	3	2	2	3	2	2 4	-	MED IUM	<ul style="list-style-type: none">Clear demarcation during the construction phase of all undisturbed sensitive areas that are not within the direct footprint of the REF to ensure that there is no uncontrolled access by construction vehicles and labourers.ECO / EO (whichever is applicable) must be present on a daily basis to remove any reptiles such as the Karoo Padloper if present.Educate contractors as to the importance of the undisturbed conservation areas and importance of avoiding them;All vehicles must stick to designated and prepared roads and adhere to the speed limit on site of 40km/hr.Mitigating the risk of poaching by fencing in the accommodation	1	3	2	1	2	2	1 8	-	LOW

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											compounds of the construction crews, to prevent individuals from wandering in the veld after hours; banning the possession of dogs on site by construction and maintenance staff.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											to current best practice in the industry.									
Bats																				
Removal of turbines	Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	1	3	1	2	1	1	8	-	LOW	<ul style="list-style-type: none">Except for compulsory lighting required in terms of civil aviation, artificial lighting during decommissioning should be minimised, especially bright lights or spotlights.Night-time decommissioning activities should be avoided as far as possible.Develop a decommissioning and remedial rehabilitation plan and adhere to compliance monitoring plan.	1	2	1	1	1	1	6	-	LOW
Heritage (Archaeology) – None identified																				
None Identified																				
Heritage (Palaeontology)																				
None Identified																				
Heritage (Cultural Landscape) – Same as Construction																				

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Ecological	Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	2	4	3	3	4	3	4	-	HIGH	<ul style="list-style-type: none"> Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), including wetlands and dams, should be protected from development as far as possible of the wind turbines or any associated development during all phases as far as possible. No wind turbines should be placed within the 1:100-year flood line of the watercourses, unless otherwise advised by the aquatic specialist. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines. This recommendation can be waived if the archaeological or hydrological / aquatic specialist reports recommend different buffers. Remaining areas of endemic and endangered natural 	2	2	2	1	4	2	2	-	LOW

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<p>vegetation should be conserved in line with relevant specialist buffers.</p> <ul style="list-style-type: none"> Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected as far as possible from development of the wind turbines or any associated development during all phases as far as possible in line with relevant ecological and aquatic specialist recommended buffers. Areas of critical biodiversity should be protected from any damage during all phases, where indigenous and endemic vegetation should be preserved at all cost. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<ul style="list-style-type: none">Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use.Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character.									
Aesthetic	WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	2	4	3	3	3	4	60	-	HIGH	<ul style="list-style-type: none">Encourage mitigation measures (for instance use of vegetation) to ‘embed’ or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc;The continuation of the traditional use of material could	2	4	2	2	2	2	24	-	MEDIUM

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<p>be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers or highly reflective untreated corrugated sheeting that clutters the landscape and is exacerbates the foreign intrusion on the natural matte landscape.</p> <ul style="list-style-type: none"> • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • The local material such as the rocks found within the area could be applied to address storm water runoff from the road to prevent erosion. • Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S				
											possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction/ decommissioning traffic must operate at speeds that reduce dust and noise as far possible.													
Historic	Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	2	4	4	3	4	4	6	-	8	VERY HIGH	<ul style="list-style-type: none">Historic farmsteads must be protected from the impacts of heavy construction vehicles and increased numbers of people. No construction traffic should pass through or closer than 50m to any outlying graded heritage structure, which includes the associated historically cultivated lands, cemeteries, unmarked burials. The most appropriate use of existing farm roads must be found to avoid farm werfs as far as possible and reduce construction impact on these heritage features. The AIA buffer recommendations should take preference for identified archaeological heritage resources.	2	2	3	2	2	2	2	-	2	LOW		

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<ul style="list-style-type: none"> Duration and magnitude of construction/ decommissioning activity must be minimized as far possible to reduce the impact of heavy vehicles on the roads as well as the associated dust from the activity. Lightest vehicles possible should be used to reduce degradation to the farm roads and the need to upgrade roads to scale and extent that negatively impacts on the integrity of the historic farm roads. Construction decommissioning traffic must operate at speeds that reduce dust and noise as far possible. Accommodation of construction staff must not negatively impact on existing farm residents or degrade the integrity of the farmstead complexes and should, without negative impact to ecological or aesthetic resources, be located outside of the farmstead complexes or site. Farm residents should be consulted on the preferable location for construction staff accommodation. 								

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		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
											<ul style="list-style-type: none">Traditional planting patterns should be protected by ensuring that existing trees are not destroyed as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes. Interpretation of these landscape features as historic remnants should occur. A buffer of 50m around such planting patterns, associated with cultural landscapes elements and farmsteads as identified in this report, should be maintained.Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and a buffer of 50m around all burial ground or unmarked graves should be in place. No turbines have been proposed for placement near known unmarked burials or family cemeteries. These recommendations should be										

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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											considered together with the AIA report and the AIA recommendations should take preference for stand-alone burial grounds or graves where they are not associated with other heritage features or cultural landscape elements.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

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											position and they should be visible from the road they are related to by passing travellers. Final buffers for stone markers will be for identification and mitigation in collaboration with the ECO and approval by heritage specialist.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Socio-economic	Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	2	3	4	4	4	4	6 8	-	VERY HIGH	<ul style="list-style-type: none"> An updated cultural landscapes impact assessment report must be completed should the WEF continue to be used after the term granted in this application. This report should include a detailed assessment of the socio-economic impacts to the cultural landscape and its outcomes and recommendations need to be considered in the decision for recommissioning and be implemented if recommissioning is approved. The continued use of the landscape for human habitation and cultivation by historic residents of the area, should be retained and encouraged as far possible to sustain the continual use pattern and human-environment relationship which is the ultimate significance of this cultural landscape element. The WEF development must allow and support this, including 	1	3	3	1	3	2	2 2	+	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											financially, and not degrade this continued relationship. <ul style="list-style-type: none">The local community on and around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long-term economic benefit and local employment opportunities must be prevented.Local residents must be offered the opportunity for employment on the construction/ decommissioning and operational phases before 'importing' staff from elsewhere.Local residents must be offered employment training opportunities associated with WEF developments at all phases.									

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
										<ul style="list-style-type: none"> Sheep, cattle or game farming should be allowed to continue below the wind turbines or be rehabilitated to increase biodiversity in the area. 								
Noise																		
Noise Impacts during the day	Demolishing of the wind turbine structures, removal of concrete structures (including foundations), powerlines, substations, rehabilitation of disturbed areas.	1	1	2	1	2	1	7	-	<ul style="list-style-type: none"> No mitigation measures recommended for decommissioning activities. Construction mitigation would also be applicable for the decommissioning phase. 	1	1	2	1	2	1	7	-
Transport																		
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	3	30	-	<ul style="list-style-type: none"> Ensure staff transport is done in the 'off peak' periods and by bus as far as practically possible. Stagger material, component and abnormal loads delivery as far as practically possible. 	2	4	1	2	1	2	20	-
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	2	26	-	<ul style="list-style-type: none"> Reduction in speed of vehicles Adequate enforcement of the law Implementation of pedestrian safety initiatives 	2	3	2	4	1	1	12	-

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											<ul style="list-style-type: none"> Regular maintenance of farm fences & access cattle grids, where and if required. 									
	Increase in Dust from gravel roads	2	3	2	2	1	2	20	-	LOW	<ul style="list-style-type: none"> Reduction in speed of the vehicles Appropriate, timely and high-quality maintenance required in terms of TRH20 Possible use of an approved dust suppressant techniques where required and if practically possible. Implement a road maintenance program under the auspices of the respective transport department. Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible. 	2	3	2	2	1	2	20	-	LOW
	Increase in Road Maintenance	2	3	2	2	2	2	22	-	LOW	<ul style="list-style-type: none"> Implement a road maintenance program under the auspices of the respective transport department. 	2	3	2	2	1	2	20	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S	
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	1	9	-	LOW	<ul style="list-style-type: none"> Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery as far as practically possible. Adequate enforcement of the law 	3	2	1	2	1	1	9	-	LOW	
Internal Access Road	Increase in Dust from gravel roads	1	4	1	1	1	1	8	-	LOW	<ul style="list-style-type: none"> Enforce a maximum speed limit on the development Appropriate, timely and high-quality maintenance required in terms of TRH20 Possible use of an approved dust suppressant technique where required and if practically possible 	1	3	1	1	1	2	1	4	-	LOW
	New / Larger Access points	1	4	1	2	1	1	9	-	LOW	<ul style="list-style-type: none"> Adequate road signage according to the SARTSM Approval from the respective roads department 	1	4	1	2	1	1	9	-	LOW	

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
Visual																						
<ul style="list-style-type: none">▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;▪ Potential visual impacts of increased dust emissions from decommissioning activities	<ul style="list-style-type: none">• Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.• Decommissioning activities may be perceived as an unwelcome visual intrusion.• Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.• Surface disturbance during decommissioning would expose bare soil	2	3	1	2	1	2	1	8	-	LOW	<ul style="list-style-type: none">• All infrastructure that is not required for post-decommissioning use should be removed.• Carefully plan to minimize the decommissioning period and avoid delays.• Maintain a neat decommissioning site by removing rubble and waste materials regularly.• Ensure that dust suppression procedures are maintained on all gravel internal access roads throughout the decommissioning phase.• All cleared areas should be rehabilitated as soon as possible.• Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	2	1	2	1	6	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+OR -)	S		
and related traffic; and Potential visual intrusion of any remaining infrastructure on the site.	(scarring) which could visually contrast with the surrounding environment. <ul style="list-style-type: none">Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.																					
Geotech																						
Disturbanc e/ displaceme nt/ removal of soil and rock	Ground disturbance during access road construction, foundation earthworks, platform earthworks	1	4	2	2	2	1	1	1	-	LOW	<ul style="list-style-type: none">Restore natural site topographyLandscape and rehabilitate disturbed areas timeously (e.g. revegetation)	1	3	2	1	3	1	1	0	-	LOW
Soil Erosion	Increased erosion due to vegetation clearing, alteration of natural drainage	1	2	2	2	2	1	9	-	LOW	<ul style="list-style-type: none">Temporary berms and drainage channels to divert surface runoff where neededRestore natural site topographyUse designated access and laydown area only to minimise	1	1	1	1	2	1	6	-	LOW		

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
											disturbance to surrounding areas								
Wake Effect																			
None Identified																			
Social																			
Demographic change impacts																			
Increased criminal activity	Similarly, to the construction phase, numerous people will be moving through the project area during decommissioning activities. Contractors and related staff will need to cross private property to get to the site, which could provide an opportunity for criminals.	Negative								<ul style="list-style-type: none">Mitigation to be applied as described in the construction phase..									
Increased fire hazard	An increased human presence during decommissioning potentially adds to the risk of accidental veld fires resulting from decommissioning activities which could result from exposed fires for cooking	Negative								<ul style="list-style-type: none">Mitigation to be applied as described in the construction phase.									

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
	and warmth, cigarettes, burning of fire breaks, and the use of flammable liquids.																	
Improved visual landscape	Earlier, reference was made to the WEF negatively impacting the sense of place of that area because of its impact to the visual landscape. After decommissioning, it is expected that this visual impact will be substantially less or completely reversed if the landscape is returned to its original condition.								Positive									• Mitigation to be applied as described in the construction phase.
Increased employment opportunities	It is anticipated that this impact will manifest similarly as is described for the construction phase.								Positive									• Impact enhancement to be applied as described in the construction phase.
Increased opportunities for local SMEs	It is anticipated that this impact will manifest similarly as is described for the construction phase.								Positive									• Impact enhancement to be applied as described in the construction phase.

14.3.5 No Go Alternative

Table 28: No-Go

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)											
Aquatic / Freshwater																				
impact on aquatic resources should the project not go ahead (i.e. the No Go Alternative)	Should the project not proceed, then the current status quo with regards to the environment would remain unchanged. Overall, the area is largely in a natural state. But present day impacts do occur in localised areas and include the following: <ul style="list-style-type: none">• Increase in unpalatable species due to past grazing activities• Erosion as a result of road crossings;• Several farm dams; and• Undersized culverts within existing road crossings.	1	3	2	1	2	2	18	-	LOW	<ul style="list-style-type: none">• Improve current grazing management, although this is occurring within the surrounding conservation areas and / or areas that are used for any hunting / game farming.• Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region• Install properly sized culverts with erosion protection measures at the present road / track crossings	1	3	2	1	2	2	18	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL STATUS (+ OR -)	S											
Terrestrial Ecology																				
Impact on terrestrial resources should the project not go ahead (i.e. the No Go Alternative)	Should the project not proceed, then current status quo with regard the environment would remain unchanged. Overall, the area is largely in a natural state. But present-day impacts do occur in localised areas and include the following: <ul style="list-style-type: none">• Increase in unpalatable flora species due to past grazing activities;• Erosion as a result of road crossings;• Several farm dams; and• Undersized culverts within the existing road crossings.	1	3	2	1	2	2	18	-	LOW	<ul style="list-style-type: none">• Improve current grazing management, although this is occurring within the surrounding conservation areas and / or areas that are used for any hunting / game farming• Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region• Install properly sized culverts with erosion protection measures at the existing road / track crossings.	1	3	2	1	2	2	18	-	LOW
Agricultural – Compliance Statement																				
None Identified																				

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+OR-)	S											
Avifaunal																					
None Identified																					
Bats																					
None Identified																					
Heritage (Archaeology)																					
None Identified																					
Heritage (Palaeontology)																					
Fossil heritage resources	Disturbance, damage or destruction of fossils at or beneath the ground surface due to natural weathering and erosion farming activities and possible illegal fossils collection	1	2	4	2	4	1	1 3	-	MED IUM	• N/A									N/A	
Heritage (Cultural Landscape)																					
None Identified																					
Noise																					
Ambient sound levels to	Ambient sound levels to remain as is.	1	4	1	1	4	1	1 1	+	LOW	• No mitigation recommended measures		1	4	1	1	4	1	1 1	+	LO W

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S										
remain unaffected.																				
Transport																				
None Identified																				
Visual																				
None Identified																				
Geotech																				
None Identified																				
Social																				
None Identified																				

Table 29: Risks and Design Mitigation Measures associated with the proposed Battery Technology

<u>Risk/impacts</u>	<u>Mitigation</u>
Li-ion battery technology	
Temperature fluctuations Temperature fluctuations in the Beaufort West (minimum temperatures of below 0°C and maximum temperatures of over 25°C) mean that the batteries may be at risk of being damaged due to instability of temperatures. Resultant impacts could include fire, or permanent structural damage to the batteries.	The design of the Li-ion system includes: <ul style="list-style-type: none"> ▪ Insulated containers ▪ High powered HVAC (Heating, Ventilation and Air-Conditioning) System monitored centrally. ▪ Multiple temperature sensors for both the cells and air temperature ▪ Automated shut down mechanism if temperatures get too high

Risk/impacts	Mitigation
	<ul style="list-style-type: none"> Containers sealed and douse in case of fire to prevent the spread Battery management system to prevent overuse and maintain good battery condition
<p>Fire and dangerous chemicals</p> <p>The volatility of the battery system, prior to any mitigation, could result in significant fire danger. In addition to this, there is a risk associated with the chemicals contained within the actual battery storage system itself.</p>	<p>The design of the Li-ion system includes:</p> <ul style="list-style-type: none"> Fire detection and suppressant systems Gas level monitoring for several different gases (related to degradation of the batteries that increases risk of fire) Heat sensors Battery condition monitoring Dousing mechanism for emergency cooling and fire suppression Density limits in the containers Spacing limits between containers

14.3.6 Cumulative

The proposed WEF is located adjacent to several other WEFs within 35km of Kraaltjies WEF. SiVEST undertook every effort to obtain the information (including specialist studies, BA / EIA / Scoping and EMPr Reports) and the Renewable Energy EIA Application Database for SA from the Department of Fisheries, Forestry and Environment (DFFE) for the surrounding developments, however, many of the documents are not currently publicly available to download. The information that could be obtained for the surrounding planned renewable energy developments was taken into account as part of the cumulative impact assessment.

The WEFs that were considered are indicated in **Table 30** and **Figure 70** below:

Table 30: Renewable energy developments within a 35km radius of the proposed Kraaltjies WEF

Project	DEA Reference No	Technology	Capacity	Max number of turbines	Land parcel area km ²	Status of Application / Development
Proposed Beaufort West Wind Farm	12/12/20/1784/1	Wind	140 MW	70	43	Approved
Proposed Trakas Wind Farm	12/12/20/1784/2	Wind	140 MW	70	54	Approved
Proposed Leeu Gamka Solar Power Plant	12/12/20/2296	Solar	-	n/a	199	EIA in Process
Proposed Koup 1 WEF	14/12/16/3/3/2/2120	Wind	140 MW	32	28	Approved
Proposed Koup 2 WEF	14/12/16/3/3/2/21201	Wind	140 MW	32	24	Approved
Proposed Kwagga WEF 1	14/12/16/3/3/2/2070	Wind	279 MW	45	51	Approved
Proposed Kwagga WEF 2	14/12/16/3/3/2/2071	Wind	341 MW	55	91	Approved
Proposed Kwagga WEF 3	14/12/16/3/3/2/2072	Wind	204.6 MW	33	94	Approved
Proposed Heuweltjies WEF	14/12/16/3/3/2/2263	Wind	240 MW	60	40	EIA in Process

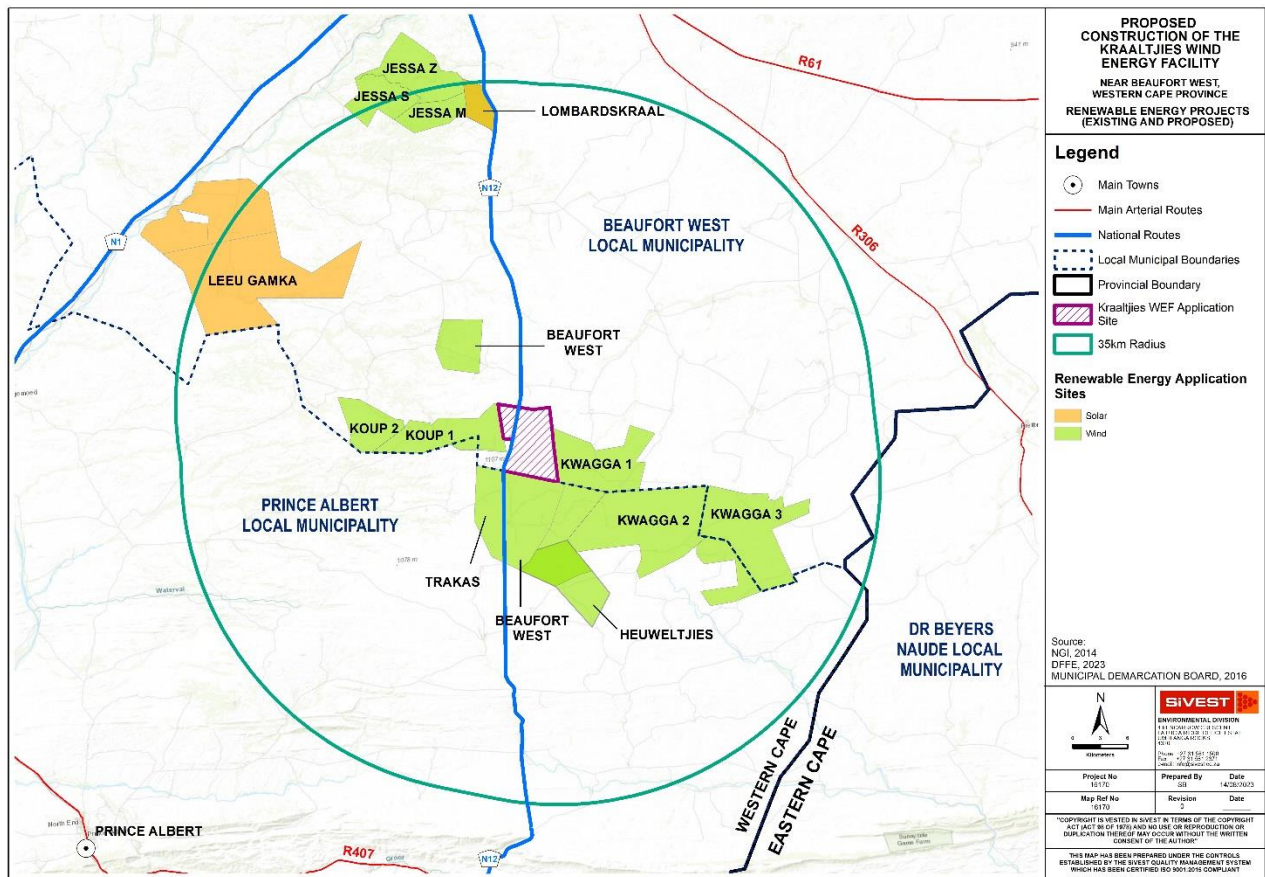


Figure 70: Renewable Energy Projects within 35km of the Kraaltjies WEF

Cumulative Impacts

Table 31: Cumulative Impacts

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)			
Aquatic / Freshwater																					
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the author has either been involved in the assessment of these projects and / or review of the past assessments as part of any required Water Use Licenses.	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none">The premise of all the reviewed or assessed projects has been the avoidance of impacts on the Very High Sensitivity environments, which have been achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads (including associated underground cabling) and or overhead powerlines over minor watercourse / drainage lines or areas rated as LOW sensitivity.	1	3	2	1	2	2	1	8	-	LOW
Terrestrial Ecology																					
Cumulative Impact of various proposed wind farms	The cumulative assessment considers the various proposed renewable projects that occur within a 35km radius of this site, where the	1	1	1	1	1	1	5	-	LOW	<ul style="list-style-type: none">The premise of all the reviewed or assessed projects has been the avoidance of impacts on the Very High Sensitivity environments, which have been	1	3	2	1	2	2	1	8	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
and associated grid lines on the natural environment	author has either been involved in the assessment of these projects and / or review of the past assessments as part of any required Water Use Licenses										achieved by the various proposed layouts. The only remaining impacts will be the crossing of internal roads (including associated underground cabling) and or overhead powerlines and overhead powerlines over minor watercourse / drainage lines or areas rated as LOW sensitivity.													
Agricultural – Compliance Statement																								
None Identified																								
Avifaunal																								
Avifauna	Mortality due to collisions with the wind turbines Displacement due to disturbance during construction and operation of the wind farm Displacement due to habitat change and loss at the wind farm Mortality due to electrocution on the electrical infrastructure	1	4	2	3	3	3	3	9	-	MEDIUM	<ul style="list-style-type: none">All the mitigation measures listed in the various bird specialist studies compiled for the eleven (11) renewable energy facilities within a 35km radius around the project.	1	2	2	3	3	2	2	-	LOW			

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Bats																				
Destruction of active roosts on several WEFs.	Cumulative effect of destruction of active roost of several WEFs as well as features that could serve as potential roosts.	3	3	3	2	3	3	4 2	-	MED IUM	<ul style="list-style-type: none">Although the developer does not have any control over other wind energy development, project specific mitigation, as included in the respective Bat Impact Assessments of the projects in the surrounding area, mitigation should be adhered to for each renewable energy project. This can however only be enforced by the regulating authority.Post construction monitoring as per the relevant South African guidelines should be applied at all wind farms in the vicinity.	3	3	2	2	3	2	2 6	-	MEDIUM
Direct collision and barotrauma of several WEFs.	Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	3	4	3	3	3	3	4 8	-	HIG H	<ul style="list-style-type: none">Although not enforceable by the Kraaltjies applicant, all REFs must adhere to their project specific mitigation measures, especially buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project.Post construction monitoring, as per the relevant South African	3	3	2	3	3	3	4 5	-	HIGH

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											Bat Guidelines applicable at the time, is of crucial importance.									
Mortality of several WEFs on migrating bats.	Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several WEFs	3	3	3	3	3	3	4 5	-	HIGH	<ul style="list-style-type: none">Although not enforceable by the Kraaltjies applicant, all REFs must adhere to their project specific mitigation measures, especially buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project. This can however only be enforced by the regulating authority.Post construction monitoring, as per the relevant South African Bat Guidelines applicable at the time, is of crucial importance.	3	2	2	3	3	3	3 6	-	MEDIUM
Habitat loss over several WEFs	Several WEFs stretching over thousands of hectares.	3	4	3	3	3	3	4 8	-	HIGH	<ul style="list-style-type: none">Although not enforceable by the Kraaltjies applicant, all REFs must adhere to their project specific mitigation measures, especially buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project. This can however only be	3	4	2	3	3	2	3 0	-	MEDIUM

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
											enforced by the regulating authority. <ul style="list-style-type: none">Post construction monitoring, as per the relevant South African Bat Guidelines applicable at the time, is of crucial importance.									
Reduction in the size, genetic diversity, resilience, and persistence of bat populations	Several wind farms with associated bat mortality reducing the size, genetic diversity, resilience, and persistence of bat populations over the lifespans of WEFs.	3	3	3	3	3	3	4 5	-	HIGH	<ul style="list-style-type: none">Although not enforceable by the Kraaltjies applicant, all REFs must adhere to their project specific mitigation measures, especially buffer zones and sensitivity areas and recommended mitigation, for each renewable energy project. This can however only be enforced by the regulating authority.Post construction monitoring, as per the relevant South African Bat Guidelines applicable at the time, is of crucial importance.	3	3	3	3	3	3	4 2	-	MEDIUM
Heritage (Archaeology)																				
Heritage Resources	The extent that the addition of this project will have on the overall impact of	4	2	4	4	4	2	3 6	-	MEDIUM	It can clearly be noted that the area in general is abundant with Stone Age and historical remains.	4	1	4	4	4	1	1 7	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	developments in the region on heritage resources.										However, until a regional detailed study is commissioned by HWC or SAHRA, no further mitigations measures can be proposed other than those already recommended for the site-specific mitigation of sites in this report.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION										
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S	
	landscape altering the character and sense of place										on the N12 scenic route and the character and sense of place of the cultural landscape of the Koup region, other than those projects already approved to date, further RE, but specifically WEF, development should be contained within the Beaufort West REDZ. As per the Oberholzer Landscape Report for REDZ (2021), the WEF's should read as separate developments of no more than 30 turbines per cluster with vast spaces of at least 6km in between to continue the reading on the landscape of places amongst the vastness as is the historical trend of farmsteads in the Koup region.										
Historic	Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	3	4	4	4	4	4	7 6	-	VER Y HIG H	on the N12 scenic route and the character and sense of place of the cultural landscape of the Koup region, other than those projects already approved to date, further RE, but specifically WEF, development should be contained within the Beaufort West REDZ. As per the Oberholzer Landscape Report for REDZ (2021), the WEF's should read as separate developments of no more than 30 turbines per cluster with vast spaces of at least 6km in between to continue the reading on the landscape of places amongst the vastness as is the historical trend of farmsteads in the Koup region.	3	2	3	2	3	2	2 6	-	MEDIUM	
Socio- economic	Inappropriate cumulative development degrade the significant socio-economic opportunities of the cultural landscape	3	4	3	4	4	4	7 2	-	VER Y HIG H	on the N12 scenic route and the character and sense of place of the cultural landscape of the Koup region, other than those projects already approved to date, further RE, but specifically WEF, development should be contained within the Beaufort West REDZ. As per the Oberholzer Landscape Report for REDZ (2021), the WEF's should read as separate developments of no more than 30 turbines per cluster with vast spaces of at least 6km in between to continue the reading on the landscape of places amongst the vastness as is the historical trend of farmsteads in the Koup region.	3	3	1	1	4	2	2 4	+	MEDIUM	
											• NOTE: If the recommendations in this CLA are applied to the majority of the surrounding RE developments, impacts can be reduced to ratings given in this table. With no specialist CLA reports done on the surrounding										

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
											applications, cumulative impact on the cultural landscape of the region has not been considered and cannot be included in this rating.											
Noise																						
Increased noise levels	Cumulative noises due to operating wind turbines from other wind energy facilities in the area	2	4	1	2	3	4	4	8	-	HIGH	<ul style="list-style-type: none">The layout can be changed to locate WTG further from NSR, considering the potential cumulative effect of all WTG located within 2,500 m from NSR. For the currently layout, noise levels less than 45 may be possible when relocating WTG T9, T12 and T28 further than 2,500m from all verified NSR; orThe applicant can develop a noise abatement program to reduce the noise emission levels (the applicant must select an WTG that offer a reduced noise emission mode during the planning stage) at certain wind speeds, and/or if the wind blows in a certain direction for a number of WTG (WTG within	2	2	1	3	3	2	2	2	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S				
											approximately 2,500m from NSR). The applicant should consider the potential reduction in power generation capacity of WTG operating in a reduced noise mode. <ul style="list-style-type: none">Mitigation measures provided for all phases of the project must be adhered to.													
Transport																								
Additional Traffic Generation	Increase in Traffic	2	4	1	2	1	4	4	-	0	MEDIUM	<ul style="list-style-type: none">Ensure a large portion of vehicles traveling to and from the proposed development travels in the 'off peak' periods or by bus as far as practically possible.Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible.Co-ordination between all developers in the area as far as practically possible	2	4	1	2	1	3	3	-	0	MEDIUM		

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
	Increase of Incidents with pedestrians and livestock	2	4	2	4	1	3	39	-	MEDIUM	<ul style="list-style-type: none">Reduction in speed of vehiclesAdequate enforcement of the lawImplementation of pedestrian safety initiativesRegular maintenance of farm fences, access cattle grids where and if required.Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible.Coordination between all developers in the area as far as practically possible	2	3	2	4	1	2	24	-	MEDIUM
	Increase in Dust from gravel roads	2	3	2	2	1	4	40	-	LOW	<ul style="list-style-type: none">Reduction in speed of the vehiclesConstruction of gravel roads in terms of TRH20Implement a road maintenance program under the auspices of the respective transport department.Possible use of an approved dust suppressant techniques	2	3	2	2	1	2	20	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
											where required and if practically possible. <ul style="list-style-type: none">• Construction of an on-site batching plant and tower construction to reduce trips where required and if practically possible.• Coordination between all developers in the area as far as practically possible.											
	Increase in Road Maintenance	2	3	2	2	2	2	2	2	-	LOW	<ul style="list-style-type: none">• Implement a road maintenance program under the auspices of the respective transport department.• Construction of an on-site batching plant and tower construction to reduce trips.• where required and if practically possible.• Coordination between all developers in the area as far as practically possible.	2	3	2	2	2	2	2	-	LOW	
Abnormal Loads	Additional Abnormal Loads	3	2	1	2	1	4	3	6	-	MEDIUM	<ul style="list-style-type: none">• Ensure abnormal vehicles travel to and from the proposed development in the 'off peak' periods or stagger delivery as far as practically possible.	3	2	1	2	1	2	1	8	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
Internal Access Road	Increase in Dust from gravel roads	1	4	1	1	1	3	24	-	MEDIUM	<ul style="list-style-type: none">Enforce a maximum speed limit on the development.Appropriate, timely and high-quality maintenance required in terms of TRH20.Possible use of an approved dust suppressant techniques, where required and if practically possible.	1	3	1	1	1	2	14	-	LOW
	New / Larger Access points	1	4	1	2	1	2	18	-	LOW	<ul style="list-style-type: none">Adequate road signage according to the SARTSM.Approval from the respective roads department	1	4	1	2	1	1	9	-	LOW

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S		
Visual																						
<ul style="list-style-type: none">▪ Potential alteration of the visual character and sense of place in the broader area.▪ Potential visual impact on receptors in the study area.Potential visual impact on the night time visual	<ul style="list-style-type: none">• Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.• Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.• Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.	3	4	2	3	3	2	2	8	-	MEDIUM	<ul style="list-style-type: none">• Carefully plan to minimise the construction period and avoid construction delays.• Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.• Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.• Vegetation clearing should take place in a phased manner as far as practically possible.• Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.• As far as possible, limit the number of maintenance vehicles which are allowed to access the facility.• Ensure that dust suppression techniques are implemented on all gravel internal access roads.	3	3	2	2	2	2	2	4	-	MEDIUM

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	S
environ ment.	<ul style="list-style-type: none">The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.										<ul style="list-style-type: none">As far as possible, limit the amount of security and operational lighting present on site.Light fittings for security at night should reflect the light toward the ground and prevent light spill.Lighting fixtures should make use of minimum lumen or wattage.Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.If possible, make use of motion detectors on security lighting.The operations and maintenance (O&M) buildings should not be illuminated externally at night.The O&M buildings should be painted in natural tones that fit with the surrounding environment.									

ENVIRON MENTAL PARAMET ER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)		S	E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)
Geotech																			
None Identified																			
Social																			
None Identified																			

14.3.7 Comparative Assessment of Alternatives

A comparative assessment of the alternatives will be provided in the EIA phase.

A preliminary comparative assessment of the alternatives is provided in the table below and further detailed in the respective specialist studies:

Key:

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Table 32: Assessment of Layout Alternatives

	Substation/ BESS/ O&M building areas	
	Option 1	Option 2
Surface Water Assessment	Preferred	Least preferred
Biodiversity Assessment	Preferred	Least preferred
Agricultural Assessment;	No Preference	No Preference
Avifaunal Assessment	No preference	No preference
Bat Assessment	No preference	No preference
Heritage Assessment – Archaeological	No preference	No preference
Heritage Assessment – Paleontological	No Preference	No Preference
Heritage Assessment – Cultural Landscape	Preferred	Favourable
Noise Assessment;	No Preference	No Preference
Transport Assessment	No Preference	No Preference
Visual Assessment	Favourable	Favourable
Geotechnical Assessment	N/A	N/A
Social Assessment	N/A	N/A

14.4 Concluding statement for preferred alternative

No activity alternatives are being considered. Renewable Energy development in South Africa is highly desirable from a social, environmental and development point of view. Wind energy installations are more suitable for the site because of the high wind resource. The choice of technology selected for the Kraaltjies WEF was based on environmental constraints and technical and economic considerations. The size of the wind turbines will depend on the development area and the total generation capacity that can be produced as a result. Therefore, no technology alternatives will be considered.

Site layout alternatives have not been comparatively assessed, but rather a single layout has been refined as additional information become available throughout the EIA process. The layout has therefore been refined throughout the process from the scoping phase through to the impact assessment phase which has resulted in a layout where all turbine and supporting infrastructure avoids the no-go areas identified. The proposed layout has

been assessed by the specialists in their respective specialist studies. All constraints identified to date as indicated in the sensitivity mapping have been taken into account and the turbines and supporting infrastructure shifted where necessary to inform the proposed turbine layout for the Kraaltjies WEF.

All constraints identified to date (as well as buffer areas) as indicated in the sensitivity mapping have been taken into account and the Wind turbines and supporting infrastructure shifted where necessary to inform the proposed layout for the Kraaltjies WEF (**Figure 72** below). This is the layout being put forward for environmental authorisation.

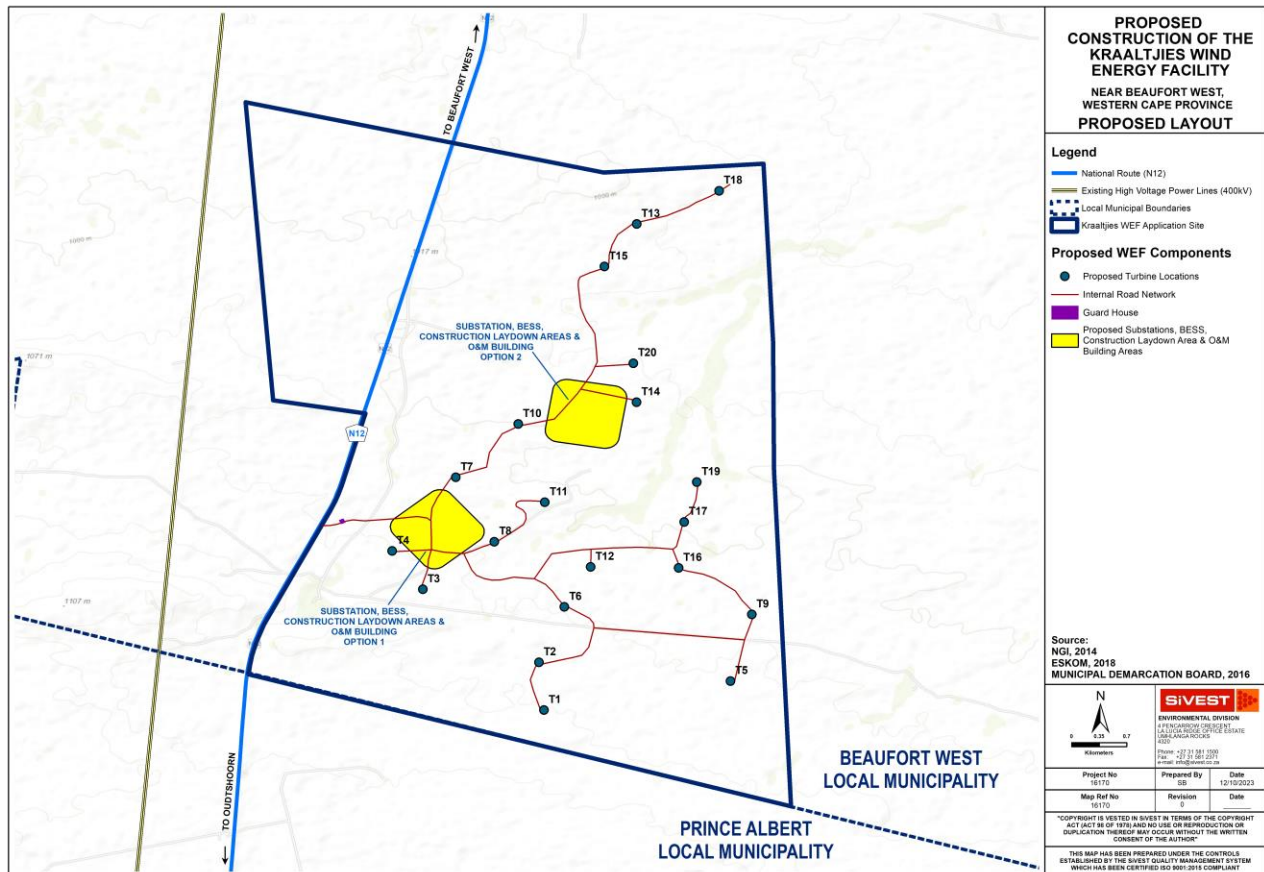


Figure 71: Proposed layout showing the substation alternatives.

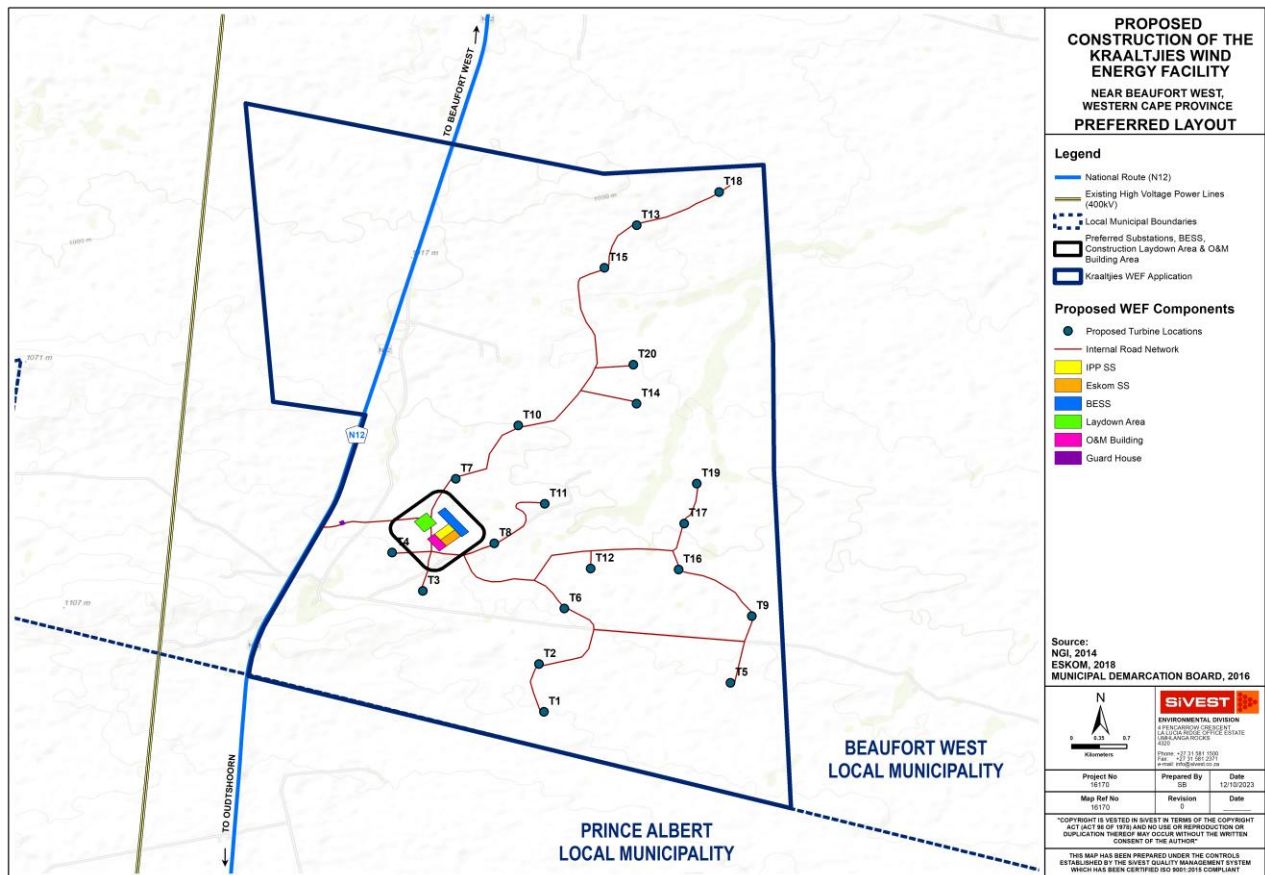


Figure 72: Proposed layout put forward for authorisation

15. POSITIVE AND NEGATIVE IMPACTS OF THE KRAALTJIES WEF PROJECTS

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

Table 33: Summary of positive and negative impacts

Impact	Pre-mitigation	Post-mitigation
PLANNING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
None Identified		
Terrestrial Ecology		
None Identified		
Agricultural		
None Identified		
Avifauna		
None Identified		
Bat		

Impact	Pre-mitigation	Post-mitigation
Placing turbine positions in sensitive bat habitat	MEDIUM	LOW
Heritage		
Archaeology		
The graves and burial grounds are located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	MEDIUM	LOW
One historical homestead is located less than 100m away from existing farm roads. The expansion of existing farm roads may impact the sites.	MEDIUM	LOW
Four structures are located less than 100m away from existing farm roads within the proposed development area. The expansion of existing farm roads may impact the sites	MEDIUM	LOW
Due to the size of the area assessed, there's a possibility of encountering heritage features in un-surveyed areas does exist.	MEDIUM	LOW
Palaeontology		
None Identified		
Cultural Landscape		
Inappropriate infrastructure layout planning degrades ecological elements of the cultural landscape.	HIGH	LOW
Inappropriate infrastructure layout planning negates aesthetic and sense of place requirements of the cultural landscape.	VERY HIGH	MEDIUM
Inappropriate infrastructure layout planning degrades historic elements of the cultural landscape	VERY HIGH	LOW
Non-landowner residents' lack of representation in planning and public participation process leads to loss of local knowledge, socio-economic empowerment and character of the cultural landscape.	VERY HIGH	LOW
Noise		
Light delivery vehicles moving around onsite for surveying	LOW	LOW
Transport		
None Identified		
Visual		
None Identified		
Geotech		
None Identified		
Wake Effect		
None Identified		
Social		
Demographic change impacts		
Increased spread of disease	NEGATIVE	
Increased criminal activity	NEGATIVE	
Increased pressure on existing infrastructure and services	NEGATIVE	
Tension/competition between newcomers and local residents/communities	NEGATIVE	
Impacts arising from geographical or environmental changes		
Increased fire hazard	NEGATIVE	
Reduced safety in and around the project areas	NEGATIVE	
Site specific social sensitivities	NEGATIVE	
Impacts arising from economic change		
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
Potential loss of revenue to tourism and ecotourism operations	NEGATIVE	
Unintended damages to private property	NEGATIVE	
CONSTRUCTION		
Impacts to Biophysical Systems		
Aquatic / Freshwater		

Impact	Pre-mitigation	Post-mitigation
Loss of aquatic species of special concern	LOW	LOW
Damage or loss of riparian and alluvial systems in the construction phase	MEDIUM	LOW
Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	MEDIUM	LOW
Terrestrial Ecology		
Loss of species of special concern	LOW	LOW
Loss of terrestrial habitats – flora and vegetation	MEDIUM	LOW
Loss of terrestrial species - fauna	MEDIUM	LOW
Agricultural		
None identified		
Avifauna		
Displacement due to disturbance linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	MEDIUM	LOW
Displacement due to habitat transformation linked to the construction of the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling).	LOW	LOW
Bat		
Clearing and excavation of natural habitat.	MEDIUM	LOW
Creating features which attract bats	MEDIUM	LOW
Construction activities	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	HIGH	LOW
Cultural Landscape		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	HIGH	LOW
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	HIGH	MEDIUM
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	VERY HIGH	LOW
Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	VERY HIGH	LOW
Noise		
Construction activities relating to the development of access roads (construction of new roads and upgrading of existing roads).	LOW	LOW
Construction traffic using access roads in vicinity of NSR.	LOW	LOW
Construction activities relating to hardstand areas, digging of foundations for wind turbines, civil works as well as erection of wind turbines	MEDIUM	LOW
Construction activities relating to civil works as well as erection of wind turbines	MEDIUM	LOW
Transport		
Increase in Traffic	MEDIUM	LOW
Increase of Incidents with pedestrians and livestock	MEDIUM	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none"> Large construction vehicles, equipment and construction material stockpiles will alter the natural character of the study area and expose visual receptors to impacts associated with construction. 	LOW	LOW

Impact	Pre-mitigation	Post-mitigation
<ul style="list-style-type: none">Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.Surface disturbance during construction would expose bare soil resulting in visual scarring of the landscape and increasing the level of visual contrast with the surrounding environment.Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.		
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	LOW	LOW
Increased erosion due to vegetation clearing, alteration of natural drainage	LOW	LOW
Wake Effect		
None identified		
Social		
Demographic change impacts		
Increased spread of disease	NEGATIVE	
Increased criminal activity	NEGATIVE	
Increased pressure on existing infrastructure and services	NEGATIVE	
Tension/competition between newcomers and local residents/communities	NEGATIVE	
Impacts arising from geographical or environmental changes		
Increased fire hazard	NEGATIVE	
Reduced safety in and around the project areas	NEGATIVE	
Site specific social sensitivities	NEGATIVE	
Impacts arising from economic change		
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
Potential loss of revenue to tourism and ecotourism operations	NEGATIVE	
Unintended damages to private property	NEGATIVE	
OPERATIONAL		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Impact on aquatic systems through the possible increase in surface water runoff on form and function during the operational phase	MEDIUM	LOW
Terrestrial Ecology		
Loss of terrestrial species - fauna		
Agricultural		
None Identified		
Avifauna		
Mortality of priority species due to collisions with the wind turbines.	MEDIUM	LOW
Mortality of priority species due to electrocutions on the overhead sections of the internal 11-33kV cables	MEDIUM	LOW
Mortality due to collisions with the overhead sections of the internal 11-33kV cables.	MEDIUM	LOW
Bat		
Fatality through direct collision or barotrauma of resident bats occupying the airspace amongst the turbines. The turning blades of the turbines during operation are the most important aspect of the project that would impact negatively on bats. High flying (high risk) species have predominantly been confirmed at the proposed Kraaltjies WEF site.	HIGH	MEDIUM
Bat fatality during migration. Limited activity by <i>Miniopterus natalensis</i> , a Near Threatened migration species, had been recorded. Not much research has been conducted on migration of bats in South Africa, and some of the other species occurring on site could also migrate.	HIGH	MEDIUM

Impact	Pre-mitigation	Post-mitigation
Bat fatality of bat species of conservation value. Calls similar to the red data <i>Miniopterus natalensis</i> have been recorded, as well as the endemic <i>Eptesicus hottentotus</i> .	HIGH	MEDIUM
Bat mortality due to the attraction of bats to wind turbines. Bats have been shown to sometimes be attracted to wind turbines out of curiosity or reasons still under investigation.	LOW	LOW
Loss of habitat and foraging space during operation of the wind turbines.	HIGH	MEDIUM
Reduction in the size, genetic diversity, resilience and persistence of bat populations. Bats have low reproductive rates and populations are susceptible to reduction by fatalities other than natural death. Furthermore, smaller bat populations are more susceptible to genetic inbreeding.	MEDIUM	MEDIUM
Wake Effect		
Wake impact on planned neighbouring wind farms	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
None Identified		
Cultural Landscape		
Inappropriate operational activities degrade the significant ecological elements of the cultural landscape	HIGH	LOW
Inappropriate operational activities degrade the significant aesthetic elements of the cultural landscape altering the character and sense of place	HIGH	MEDIUM
Inappropriate operational activities degrade the significant historic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM
Inappropriate operational activities degrade the significant socio-economic opportunities of the cultural landscape	VERY HIGH	MEDIUM
Noise		
Noises from operating wind turbines	MEDIUM	LOW
Noises from operating wind turbines	HIGH	LOW
Transport		
Increase in Traffic	LOW	LOW
Increase of Incidents with pedestrians and livestock	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none"> The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. The proposed WEF and associated infrastructure will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. The night time visual environment will be altered as a result of operational and security lighting at the proposed WEF. Shadow flicker impacts may affect residents within 800m of a turbine placement. 	MEDIUM	MEDIUM
Geotech		
Increased erosion due to alteration of natural drainage	LOW	LOW
Wake Effect		
Wake impact on planned neighbouring wind farms	LOW	LOW
Social		
Impacts arising from economic change		
Increased socio-economic development associated with more available electricity	POSITIVE	

Impact	Pre-mitigation	Post-mitigation
Reduced property values	NEGATIVE	
Unintended damages to private property	NEGATIVE	
Impacts arising from geographical or environmental changes		
Site specific social sensitivities	NEGATIVE	
DECOMMISSIONING		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Loss of aquatic species of special concern	LOW	LOW
Damage or loss of riparian and alluvial systems in the construction phase	MEDIUM	LOW
Potential impact on localised surface water quality (construction materials and fuel storage facilities) during the construction and decommissioning phases	MEDIUM	LOW
Terrestrial Ecology		
Loss of species of special concern	LOW	LOW
Loss of terrestrial habitats – flora and vegetation	MEDIUM	LOW
Loss of terrestrial species - fauna	MEDIUM	LOW
Agricultural		
None Identified		
Avifauna		
Displacement due to disturbance associated with the dismantling of the wind turbines and associated infrastructure.	LOW	LOW
Bat		
Bat disturbance due to decommissioning activities and associated noise, especially during night-time.	LOW	LOW
Heritage		
Archaeology		
None Identified		
Palaeontology		
None Identified		
Cultural Landscape		
Fragmentation and destruction of the landscape degrading the environment and thus continuous relationship between man and environment	HIGH	LOW
WEF infrastructure construction and decommissioning activity degrades the character of the cultural landscape and the sense of place	HIGH	MEDIUM
Integrity of farmsteads and farm roads degraded by insensitive construction or decommissioning activities.	VERY HIGH	LOW
Integrity of local residents to continue their patterns of land use is disregarded by the construction and decommissioning activities	VERY HIGH	LOW
Noise		
Demolishing of the wind turbine structures, removal of concrete structures (including foundations), powerlines, substations, rehabilitation of disturbed areas.	LOW	LOW
Transport		
Increase in Traffic	LOW	LOW
Increase of Incidents with pedestrians and livestock	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	LOW	LOW
Increase in Dust from gravel roads	LOW	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none"> Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. Decommissioning activities may be perceived as an unwelcome visual intrusion. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. 	LOW	LOW

Impact	Pre-mitigation	Post-mitigation
<ul style="list-style-type: none"> Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. 		
Geotech		
Ground disturbance during access road construction, foundation earthworks, platform earthworks	LOW	LOW
Increased erosion due to vegetation clearing, alteration of natural drainage	LOW	LOW
Wake Effect		
None Identified		
Social		
Demographic change impacts		
Increased criminal activity	NEGATIVE	
Increased fire hazard	NEGATIVE	
Improved visual landscape	POSITIVE	
Increased employment opportunities	POSITIVE	
Increased opportunities for local SMEs	POSITIVE	
CUMULATIVE		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	LOW	LOW
Terrestrial Ecology		
Cumulative Impact of various proposed wind farms and associated grid lines on the natural environment	LOW	LOW
Agricultural		
None Identified		
Avifauna		
<ul style="list-style-type: none"> Mortality due to collisions with the wind turbines Displacement due to disturbance during construction and operation of the wind farm Displacement due to habitat change and loss at the wind farm Mortality due to electrocution on the electrical infrastructure 	MEDIUM	LOW
Bat		
Cumulative effect of destruction of active roost of several WEFs as well as features that could serve as potential roosts.	MEDIUM	MEDIUM
Cumulative bat mortality due to direct collision with the blades or barotrauma during foraging of resident bats at several WEF sites.	HIGH	HIGH
Cumulative bat mortality of migrating bats due to direct blade impact or barotrauma during foraging of migrating bats on several WEFs	HIGH	MEDIUM
Several WEFs stretching over thousands of hectares.	HIGH	MEDIUM
Several wind farms with associated bat mortality reducing the size, genetic diversity, resilience, and persistence of bat populations over the lifespan of WEFs.	HIGH	MEDIUM
Heritage		
Archaeology		
The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources.	MEDIUM	LOW
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to surface clearance and bedrock excavations.	MEDIUM	LOW
Cultural Landscape		
Inappropriate cumulative development degrades the significant ecological elements of the cultural landscape	VERY HIGH	MEDIUM
Inappropriate cumulative development degrades the significant aesthetic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM

Impact	Pre-mitigation	Post-mitigation
Inappropriate cumulative development degrades the significant historic elements of the cultural landscape altering the character and sense of place	VERY HIGH	MEDIUM
Inappropriate cumulative development degrades the significant socio-economic opportunities of the cultural landscape	VERY HIGH	MEDIUM
Noise		
Cumulative noises due to operating wind turbines from other wind energy facilities in the area	HIGH	LOW
Transport		
Increase in Traffic	MEDIUM	MEDIUM
Increase of Incidents with pedestrians and livestock	MEDIUM	MEDIUM
Increase in Dust from gravel roads	LOW	LOW
Increase in Road Maintenance	LOW	LOW
Additional Abnormal Loads	MEDIUM	LOW
Increase in Dust from gravel roads	MEDIUM	LOW
New / Larger Access points	LOW	LOW
Visual		
<ul style="list-style-type: none"> Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. Additional renewable energy facilities in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes. The night time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area. 	MEDIUM	MEDIUM
Geotech		
None identified		
Wake Effect		
None identified		
Social		
None identified		
No-Go		
Impacts to Biophysical Systems		
Aquatic / Freshwater		
Should the project not proceed, then the current status quo with regards to the environment would remain unchanged. Overall, the area is largely in a natural state. But present-day impacts do occur in localised areas.	LOW	LOW
Terrestrial Ecology		
Should the project not proceed, then the current status quo with regards to the environment would remain unchanged. Overall, the area is largely in a natural state. But present-day impacts do occur in localised areas.	LOW	LOW
Agricultural		
None Identified		
Avifauna		
None Identified		
Bats		
None Identified		
Heritage		
Archaeology		
None Identified		
Palaeontology		
Disturbance, damage or destruction of fossils at or beneath the ground surface due to natural weathering and erosion farming activities and possible illegal fossils collection	MEDIUM	N/A
Cultural Landscape		

Impact	Pre-mitigation	Post-mitigation
None Identified		
Noise		
Ambient sound levels to remain unaffected	LOW	LOW
Transport		
None Identified		
Visual		
None Identified		
Geotech		
None Identified		
Social		
None Identified		

16. SUMMARY OF SPECIALISTS FINDINGS AND RECOMMENDATIONS

Table 34: Summary of specialist findings and recommendations

Specialist Study	Findings	Recommendations
Aquatic	<p>The project overall has a small footprint spread out over a large area, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the wind farm is such that it carries a low intensity impact on aquatic resources, but requiring the clearing of areas with terrestrial vegetation, especially when considering the associated roads, cables and other infrastructure.</p> <p>A variety of environmental features were observed within the study area and these were mapped and buffered as necessary for their protection. The current layout has the potential, to a large degree, to avoid these sensitive features and buffer areas, greatly reducing the potential overall impact and environmental risk. The overall and cumulative impacts, as assessed, are linked to instances where complete avoidance was not possible, or the nature of the activities involve a potential risk to aquatic resources even at great distance.</p> <p>Overall, it is expected that the impact on the environment would be Low (-). Noteworthy areas, that should be avoided, include the</p>	<p>Based on the characteristics of the site, and all the high sensitivity aquatic systems could be spanned and or avoided, the technically preferred substation is proposed for approval.</p> <p>Based on the findings of this study, the specialist finds no reason to withhold an environmental authorisation of any of the proposed activities, assuming that key mitigations measures are implemented and that all turbine positions have avoided all of the observed aquatic habitat, and that the technically preferred substation location containing the BESS, substations and O/M buildings as well as construction laydown area also avoids these areas.</p>

Specialist Study	Findings	Recommendations
	Very High Sensitivity areas as shown in this report. Existing crossings may be used and/or upgraded that intersect these systems however, but these crossings, detailed monitoring plan must be developed in the pre-construction phase.	
Biodiversity	<p>The project overall has a small footprint spread out over a large area, allowing for retention of much of the natural environment so that the systems should remain largely unaffected. Therefore, the wind farm is such that it carries a low intensity impact on terrestrial resources but requires the clearing of areas with terrestrial vegetation.</p> <p>A variety of environmental features were observed within the study areas, and these were mapped and buffered as necessary for their protection. The final proposed layout has avoided the most sensitive features and the associated buffer areas, greatly reducing the potential overall impact and environmental risk. Noting that these are mostly linked to the CBA/ESAs which are directly linked to the aquatic environment (Alluvial rivers and watercourses) that dominate the majority of the site.</p> <p>However, several sensitive species were observed within the site, which included both plants and reptiles, the former being found throughout the site, while the later are highly mobile, thus core sensitive areas could not be mapped as these species are thus encountered throughout the site.</p>	Based on the findings of this study, the specialist finds no reason to withhold an environmental authorisation for any of the proposed activities, assuming that key mitigations measures are implemented, and where the proposed layout including hardstand, BESS, substations and O/M buildings as well as any other temporary works areas, have avoided the relevant sensitivity areas.
Agricultural	The site has very low agricultural potential predominantly because of climate constraints, but also because of soil constraints. As a result of the constraints, the site is unsuitable for cultivation, and agricultural land use is limited to grazing. The land impacted by the development footprint is verified in this assessment as being predominantly of low agricultural sensitivity with some medium sensitivity.	<p>The recommended mitigation measures are implementation of an effective system of stormwater run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.</p> <p>From an agricultural impact point of view, it is recommended that the development be approved.</p>

Specialist Study	Findings	Recommendations
	<p>Three potential negative agricultural impacts were identified, loss of agricultural land use, land degradation, and the impact of dust. One positive agricultural impact was identified as enhanced agricultural potential through increased financial security for farming operations.</p> <p>All agricultural impacts are likely to have very low impact on levels of agricultural production and are therefore assessed as having very low significance. The amount of agricultural land loss caused by the project is well within the allowable development limits prescribed by the agricultural protocol to ensure appropriate conservation of agricultural production land. The footprint of the development is approximately eight times smaller than what the development limits allow.</p>	<p>The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions, other than recommended mitigations provided.</p>
Avifaunal	<p>It is estimated that a total of 168 bird species could potentially occur in the broader area. Of these, 20 species are classified as priority species for wind development.</p> <p>The proposed Kraaltjies WEF will have several potential impacts on priority avifauna. These impacts are the following:</p> <ul style="list-style-type: none"> Displacement of priority species due to disturbance linked to construction activities associated with the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling) in the construction phase. Displacement due to habitat transformation associated with the proposed WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling) in the construction phase. Collision mortality caused by the wind turbines in the operational phase. 	<p><u>The following is recommended and has been taken into account in the final layout proposed:</u></p> <p><u>High sensitivity No-turbine buffer: Surface water.</u></p> <ul style="list-style-type: none"> Included in this category are areas within 200m of water troughs and earth dams, and 150m from all major drainage lines. Surface water in this arid habitat is crucially important for priority avifauna, including several Red Data species such as Martial Eagle, Lanner Falcon and Secretarybird, and many non-priority species, including several waterbirds. Drainage lines, when flowing, attract waterbirds on occasion, as do the large pools that remain in the channel after the flow has stopped. Wind turbines that are placed near these sources of surface water pose a collision risk to birds using the water for drinking and bathing, and drainage lines, when flowing, are natural flight paths for birds.

Specialist Study	Findings	Recommendations
	<ul style="list-style-type: none"> ▪ Electrocution on the 11-33kV MV overhead lines (if any) in the operational phase. ▪ Collisions with the 11-33kV MV overhead lines (if any) in the operational phase. ▪ Displacement of priority species due to disturbance linked to dismantling activities in the decommissioning phase. 	<p><u>High sensitivity No-turbine buffer: Breeding Red Data species nests.</u></p> <ul style="list-style-type: none"> ▪ Transmission lines are an important breeding substrate for raptors in the Karoo, due to the lack of large trees (Jenkins et al. 2013). A Martial Eagle nest is present on Tower 108 of the Droërvier Proteus 1 - 400kV transmission line, 5km from the closest proposed turbine location, and approximately 1km from the closest border of the project site (see Appendix 3). In May 2020, both adult birds were observed perching on the towers around the nest, indicating that the territory is active. A 5km No-turbine buffer zone must be implemented around the nest to reduce the risk of turbine collisions. <p>The proposed Kraaltjies WEF and associated infrastructure (roads, substation, BESS, laydown area and internal cabling) will have a moderate impact on avifauna which, in most instances, could be reduced to a low impact through appropriate mitigation. The alternative substations (inclusive of the laydown areas) are all situated in essentially the same habitat, i.e. Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. No fatal flaws were discovered in the course of the on-site investigations. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.</p>
Bat	Although not situated close to any formally protected areas, various protected areas are located beyond the border of the proposed wind farm towards the south of the site, in the vicinity of the Swartberg mountains. The Henry Kruger Private Reserve, the nearest registered reserve, is situated within 60 km to the northwest as the crow flies, and the Karoo	The client has shifted all turbine positions outside of high sensitivity as well as medium sensitivity zones so that no operating turbine components are placed in these areas. Supporting infrastructure, such as the laydown area, on-site sub-station and Battery Energy Storage System may infringe on the sensitivity areas, if necessary, but care must

Specialist Study	Findings	Recommendations
	<p>National Park is situated approximately 70 km to the north. There is a large Critical Biodiversity Area (CBA) to the south and southeast off-site of the proposed Kraaltjies WEF site, but no CBA on the actual WEF site itself. Several private game reserves occur in the vicinity of the development site.</p> <p>The proposed study area falls within the Nama Karoo Biome and regionally within the Lower Karoo Bioregion, with Gamka Karoo being the single dominant vegetation type found within the study area (SANBI, 2012). The landscape is comprised of slightly undulating plains, covered with dwarf spinescent shrubland and low trees. Being located in the rain shadow of the Cape Fold Belt, the Gamka Karoo is considered one of the most arid units of the Nama Karoo Biome. Because of the low average annual rainfall, the carrying capacity in the proposed Kraaltjies area is low, resulting in large farm units.</p> <p>Trees situated in the non-perennial riverbeds could provide roosting opportunities for bats that prefer roosting in vegetation or under the bark of trees. Rock formations along the hilltops and along the river valleys, as well as abandoned burrows, such as aardvark holes, provide ample roosting opportunities for bats. Where roofs are not sealed off, human dwellings could provide roosting space for some bat species; culverts and stone walls also provide roosting opportunities. Water troughs for the livestock, open dams and cement reservoirs provide permanent, open water sources for bats throughout the year. During the few rainy spells, stagnant water that usually collects in small pans and dry ditches could serve as breeding grounds for insects which could serve as food for bats. as livestock attracts flies, which could also serve as a food source for bats.</p> <p>The proposed WEF is located within the distribution range of six families and approximately 12 species. Calls of five of</p>	<p>be taken to avoid any destruction of possible bat roosts, as per the Environmental Management Program (EMPr).</p> <p>Furthermore, it is recommended that the following mitigation measures be included in the Environmental Authorisation (EA):</p> <ul style="list-style-type: none"> ▪ The final layout must be informed by the sensitivity map provided in Section 7.3 of the main report. ▪ A bat specialist must be appointed before the Commercial Operation Date (COD). A mitigation scheme, as per Section 9 in the main report, must form part of the operational management plan, and be applied. ▪ Extended, intensive bat monitoring, as described in Section 9.10 to establish whether species-specific and turbine-specific mitigation is necessary for the red data <i>M. natalensis</i>. This can be undertaken post-authorisation and any additional or refined mitigation measures must be included in an updated EMPr, where recommended. ▪ Turbines must be feathered below cut-in speed, and although they need not be at a complete standstill, there should be minimum movement so that bats are not at risk when turbines are not generating power. ▪ Mitigation measures must be applied as outlined in the impact tables, Section 10, of the main report and the EMPr. ▪ Where high fatality, above the fatality threshold of the relevant guidelines, be experienced during operation, curtailment, as indicated in Section 9 of the main report, must be adapted, or bat deterrents must be installed, as guided by the operational bat specialist.

Specialist Study	Findings	Recommendations
	<p>these species have been recorded by the static recorders during the monitoring period.</p> <p>Data from passive monitoring systems, transects, roost surveys and a desktop study informed this report. Four static SM4BAT systems were deployed within the project site, with two systems located near-ground and two within the sweep of the turbine blades.</p> <p>63% of the calls of all the combined systems represent <i>Tadarida aegyptiaca</i>, which is the dominant species on site. <i>T. aegyptiaca</i> is a high-risk species, physiologically adapted with a narrow wingspan to fly high, in the vicinity of the turbine blades. Due to this foraging preference, the risk of collision and barotrauma at a WEF is high. Three more high-risk species have a significant presence: 13% of the activity was for the Near Threatened <i>Miniopterus natalensis</i>, 15% was for <i>Neoromicia capensis</i>, and 9% was for <i>Sauromys petrophilus</i>. The endemic <i>Eptesicus hottentotus</i> was also recorded at the site. The Molossidae family is more dominant at the high-altitude systems, with the Molossids <i>S. petrophilus</i> and <i>T. aegyptiaca</i> comprising nearly 100% of all the activity recorded at height (Systems N and O).</p> <p>Although the presence of <i>M. natalensis</i> was relatively low during the year, with a bit of increased activity during spring, a sudden spike of activity was recorded during May 2022 at the 10 m system Q. This might indicate the presence of migrating bats. Several potential cave structure, derelict mines and caves occur within a 100 km radius of the proposed Kraaltjies WEF, especially towards the south in the Swartberg mountain range. Calcrete deposits in these mountainous areas tend to support cave structures. Although these structures are not necessarily the size and grandeur of the</p>	<ul style="list-style-type: none"> ▪ All newly built structures that have bat conducive features must be rehabilitated to discourage bat presence. This includes roofs of new buildings, open quarries and borrow pits. A regular investigation should establish if new roofs are still sealed. ▪ A minimum of two year's operational bat monitoring must be conducted after the commencement of operations at the WEF, as per the guidance of the latest operational South African Bat Assessment Association (SABAA) guidelines.

Specialist Study	Findings	Recommendations
	<p>Cango caves, smaller structures might house <i>M. natalensis</i>, which is a cave-dwelling bat.</p> <p>The proposed Kraaltjies WEF has a low record of bat activity during winter, between June and August, with a steady increase in activity from September (spring). The highest activity had been experienced between October and May. The peak in activity experienced during October 2022, was not portrayed in October 2021, but several peaks in activity were recorded between November 2021 and May 2022, indicating high activity during the warmer summer and autumn months. After May there is a steep decline in activity as colder temperatures set in.</p>	
Heritage – Archaeological	<p>The fieldwork conducted for the evaluation of the possible impact of the new Kraaltjies WEF has revealed the presence of forty-four (44) heritage resources.</p> <p>Two (2) burial grounds (K027, KC001) were rated as having high heritage significance.</p> <p>The farmstead at KC001 was rated as having high heritage significance. Four (4) structures (K012(K012/1, K012/2, K012/3, K012/4)) were rated as having medium heritage significance and three (3) structures (K026 (K026/1), K036) were rated as having low heritage significance.</p> <p>Three (3) Stone Age sites (K022, K033, K039) were rated as having medium heritage significance and two (2) Stone Age sites (K001, K003) were rated as having low heritage significance.</p> <p>Twenty-nine (29) find spots (K002, K004-5, K007-8, K010-11, K013-21, K023-25, K028-32, K034-35, K038, K040) comprise a number of low-density Stone Age surface artefact scatters and were rated as having low heritage significance. These are primarily from the Middle Stone Age (MSA), although both Later Stone Age (LSA) and earlier Early Stone Age (ESA) material was identified. All</p>	<p>The calculated impact as summarised in Section 9 of this report confirms the impact of the new Kraaltjies WEF will be reduced from negative medium to negative low with the implementation of the mitigation measures. This finding in addition to the implementation of a chance finds procedure, as part of the EMP, will mitigate possible impacts on unidentified heritage resources.</p> <p>The following mitigation measures will be required:</p> <p>50m buffer zones around grave sites (K027, KC001)</p> <ul style="list-style-type: none"> • 30m buffer zone around farmsteads (KC001) • 30m buffer zone around historical structures (K012(K012/1, K012/2, K012/3, K012/4)) • 30m buffer zones around Stone Age sites with a medium heritage significance (K022, K033, K039) • If significant Stone Age sites (medium heritage significance or higher) can't be avoided, then sites must be sampled by a qualified specialist under a permit issued by SAHRA • An induction and training program on the management of heritage resources must

Specialist Study	Findings	Recommendations
	<p>of these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.</p>	<p>be included in the induction programs for all staff working on the project.</p> <ul style="list-style-type: none"> • An induction and training program on managing archaeological resources must be included in the induction programs for the Environmental Control/Site Officer working on the project. • An assessment of the footprint areas must be done if the project is to commence immediately pre-construction and any findings must be handled through the Chance finds protocol. <p>A chance finds protocol must be developed that includes the process of work stoppage, site protection, evaluation and informing HWC of such finds and a final process of mitigation implementation.</p>
Heritage – Paleontological	<p>Only one small palaeontological Very High Sensitivity area – located towards the southern edge of Farm Brits Eigendom No 374/25 and characterized by in situ therapsid skeletal material and abundant fish remains - has been identified within the project area (see red polygon, including a buffer zone, in satellite image Appendix 1, Figure A1.2). This High Sensitivity area lies outside the WEF and associated Infrastructure footprint. Since all known fossil sites can be readily mitigated – if necessary – through professional recording and collection of fossil material in the pre-construction phase, no recommendations for micro-siting of infrastructure such as wind turbine, pylon positions or access roads are therefore made here. There are no preferences on palaeontological heritage grounds for specific site options for the WEF on-site substation and construction laydown area, given their similar geological and palaeontological context.</p> <p>The proposed Kraaltjies WEF and associated Infrastructure development is assigned a similar overall impact significance rating</p>	<p>If (and only if) the WEF receives Environmental Authorization, the approved layout of the WEF and associated Infrastructure must be, immediately pre-construction, cross-checked by a qualified palaeontological specialist to determine what level of additional palaeontological surveying, monitoring or mitigation is necessary for these projects, if any. Should a palaeontological heritage study of selected, potentially sensitive and previously unsurveyed sectors of the authorised footprint be recommended at this stage, this should involve the recording and judicious collection by a professional palaeontologist of valuable fossil material as well as relevant geological data (e.g., on stratigraphic context, preservation style / taphonomy) within or close to (within ~10 m) the project footprint in the Pre-Construction Phase. Since mitigation through professional recording and collection is almost invariably feasible for fossil sites. During the construction phase, the Chance Fossil Finds Protocol should be fully implemented.</p> <p>The qualified palaeontologist responsible for the mitigation work will need to submit</p>

Specialist Study	Findings	Recommendations
	(Construction Phase) of NEGATIVE MEDIUM without mitigation and NEGATIVE LOW following mitigation. Residual negative impacts may be partially offset by improvements to the local palaeontological database as a result of professional mitigation of chance fossil finds. No significant further impacts on fossil heritage resources are anticipated in the planning, operational and decommissioning phases. The No-Go Option is likely to have a neutral impact significance; fossils will continue to be exposed and destroyed by natural weathering processes while the positive benefits of professional mitigation (viz. improved palaeontological database) will be lost. Anticipated cumulative impacts in the context of several planned or authorized renewable energy projects in the region are assessed as NEGATIVE MEDIUM before mitigation and NEGATIVE LOW after mitigation. These cumulative impacts fall within acceptable limits.	<p>beforehand a Work Plan for approval by Heritage Western Cape (HWC) and, following completion of mitigation, a Mitigation Report must be submitted to HWC for consideration.</p> <p>The proposed WEF and associated Infrastructure development is not fatally flawed and, on condition that the recommended mitigation measures are included within the relevant EMPr and implemented in full, there are no objections on palaeontological heritage grounds to the granting of Environmental Authorisation for the Kraaltjies WEF project.</p>
Heritage Cultural –	The findings of this report, coupled with the proposed layout for development of wind turbines, which considers appropriate placement in terms of wind energy capacity, concludes that the development can be permitted within the site if the report's recommendations are followed. The mitigating recommendations in this report consider the ecological, aesthetic, historic and socio-economic value lines that underpin the layers of significance that combine to create the character of the place and the cultural landscape of the Koup region. These recommendations include road and farmstead complex buffers which incorporate cultivated areas, graves and steep slope no-go areas, and ridgeline high sensitivity areas as well as consideration of the unique land form of the site, CBA and ESA no-go areas, as well as mechanisms to support the non-landowner residents that live on the site in being able to continue their indigenous land use patterns, knowledge and social systems.	<p>Further, the following is recommended:</p> <ul style="list-style-type: none"> Substation Option 1 is preferred in terms of cultural landscape assessment as it avoids any steep slopes, the ridgeline and the CL buffers of the farm road and N12 scenic route. Substation Option 2 is acceptable if all permanent infrastructure, other than roads, can be kept out of the N12 800m no-go buffer on final construction. <p>Further detailed social impact assessment is recommended to consider heritage:</p> <ul style="list-style-type: none"> Potential impact of WEF development on any non-landowner residents of the site needs to be assessed within the EIA Public Participation Process, to the approval of the heritage consultant, to determine the impact of the development on the historical residents of the area as an integral part of the cultural landscape.

Specialist Study	Findings	Recommendations
	These mitigations will reduce the impact on the surrounding landscape and heritage resources but due to the high visual impact of the turbines, largely a result of their height, the negative impact to the cultural landscape cannot be removed, only reduced from very high to moderate.	With the recommended CLA buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Kraaltjies WEF and associated infrastructure can be reduced from very high to moderate and the proposed project layout can be accepted in terms of cultural landscape assessment.
Noise	<p>This study considers the potential noise impact on the surrounding environment due to the construction, operational and future decommissioning activities associated with the Project. It makes use of conceptual scenarios to develop noise propagation models to estimate potential noise levels. Considering the ambient sound levels measured onsite, the proposed noise limits as well as the calculated noise levels, it was determined that the significance of the potential noise impacts would be:</p> <ul style="list-style-type: none"> • of a low significance for the construction of access roads (or upgrading of existing roads); • of a low significance relating to noises from construction traffic; • of a medium significance for the daytime construction activities (hard standing areas, excavation and concreting of foundations and the assembly of the WTG and other infrastructure). This finding relates to the very low ambient sound levels measured during the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level which will change the significance to low; • of a potential medium significance for the night-time construction activities (the potential pouring of concrete, erection of WTG). This finding relates to the very low ambient sound levels measured during 	<p>Active noise monitoring is recommended because the projected noise levels are more than 38.7 dBA (the level defined by the WHO where noise levels from WTG may become annoying) for the layout and WTG as assessed in this report. Noise levels is projected to be higher than 45 dBA at NSR for a WTG with an SPL of 107.0 dBA (re 1 pW).</p> <p>It is highlighted that the applicant re-evaluates the noise impact:</p> <ul style="list-style-type: none"> • should the layout be revised where: • any WTG, located within 1,500 m from any NSR are moved closer; • the number of WTG within 2,500 m from any NSR are increased; and • should the applicant make use of a wind turbine with a maximum SPL exceeding 112.6 dBA re 1 pW. <p>If the project is to be developed in the future, the layout and sound power emission levels of the selected WTG must be re-assessed to ensure the noise levels are less than 45 dBA at verified NSR (if the applicant changed the layout or the WTG as assessed in this report).</p> <p>To ensure that noise does not become an issue for future residents, landowners or the local communities, it is recommended that, should the project receive environmental authorisation, the applicant get written agreement from current landowners and/or community leaders that no new residential dwellings will be developed within areas enveloped by the 42 dBA noise level contour.</p>

Specialist Study	Findings	Recommendations
	<p>the site visit, as well as the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level which will change the significance to low;</p> <ul style="list-style-type: none"> • of a medium significance for daytime operational activities (noises from wind turbines) when considering the worst-case SPL. This finding is due to the strict EIA criteria employed in this assessment. Mitigation however is available that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level which will change the significance to low; and • of a high significance for night-time operational activities (noises from wind turbines) when considering the worst-case SPL. Mitigation is available and included in this assessment that could reduce the probability of the impact occurring as well as the intensity/magnitude of the noise level which will change the significance to low. <p>There is a low risk for a cumulative noise impact to occur during the operational phase, with the high significance rating associated with the projected operational noise impact. Noises from other WEFs in the area will not raise the noise levels at the NSR.</p>	<p>From an acoustic perspective the WTG layout is considered acceptable should the applicant select to use a WTG with a SPL less than 106.5 dBA (re 1 pW). Should the applicant select to use a WTG with an SPL exceeding 107.0 dBA (re 1 pW), additional mitigation measures must be implemented to ensure that total noise levels are less than 45 dBA at verified NSR (locations where residential activities would be taking place during the operational phase). Potential mitigation measures were highlighted in this noise assessment. Subject to the condition that the applicant limit total noise levels to less than 45 dBA, it is recommended that the Kraaltjies WEF be authorized (from an acoustic perspective).</p>
Transportation	<p>The traffic specialist doesn't foresee any major risks concerning the proposed development.</p> <p>The development is located in close proximity to provincial roads. An existing access onto the facility already exists in the form of a farm access point, however, the access for the future facility expansions, could be upgraded or moved to a new position in order to</p>	<p>It is SiVEST's opinion that the Kraaltjies WEF and associated infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigations measures in this report are implemented, and hence the Environmental Authorisation (EA) should be granted for the EIA application.</p>

Specialist Study	Findings	Recommendations
	<p>accommodate the proposed adjusted land use.</p> <p>The construction / balance of plant phase of this development will typically generate the highest number of additional vehicles. It will however be temporary, and impacts are considered to be nominal. The existing access onto PTN 8 from Road DR02301 @ Km 68.01 does not have sufficient sight distance to the east or west and hence will require relocation. A new access position @ Km 70.00 is proposed and hence approval and a wayleave application will be required from the Western Cape Department of Transport & Public Works (WCDTPW) prior to work commencing.</p> <p>No formal access position onto REM of Witpoortjie is in place and therefore propose that both farms share the proposed access position @ Km 70.00.</p>	
Visual	<p>A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low to moderate visual sensitivity. However, an important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs.</p> <p>The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of thirty-five (35) potentially sensitive receptors were identified in the combined study area, all of which are located within 10kms of a turbine placement in the Kraaltjies WEF EIA Phase layout. Three of the receptors identified were found to be linked to</p>	<p>It is the specialist's opinion that the potential visual impacts associated with the proposed Kraaltjies WEF are negative and of moderate significance. Given the low level of human habitation and the absence of sensitive receptors, however, the project is deemed acceptable from a visual perspective and the EA should be granted. The specialist is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.</p>

Specialist Study	Findings	Recommendations
	<p>leisure-based (specifically nature-based) tourism and are therefore considered to be sensitive receptors, although Rietpoort Game Farm was found to be outside the viewshed for the EIA Phase turbine layout. Neither of the remaining sensitive receptors, namely ROAM Safari Lodge and Silwerkaroo Guest House are however expected to experience high levels of visual impact from the proposed WEF facility. Both of these receptors are expected to experience only moderate levels of visual impact. It is believed that ROAM Safari Lodge provides leisure or nature-based tourist facilities located on a relatively large farm property. Details of the levels of activity on different sectors of the farm are not however known and as such, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on the property. Accordingly, it should be noted that sections of the property may be slightly closer to the proposed WEF, and as such could be subjected to higher levels of visual impacts, depending on the location of the wind turbines in the final layout. Silwerkaroo Guest House is located inside the proposed Kraaltjies WEF development area and as such, this property forms part of the WEF project. Thus, it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light.</p> <p>The remaining thirty-two identified receptors are all assumed to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Seven potentially sensitive receptors were however found to be outside the viewshed for the EIA Phase turbine layout and were excluded from ant further assessment.</p>	

Specialist Study	Findings	Recommendations
	<p>Six of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed Kraaltjies WEF. The high sensitivity rating relates largely to the fact that these receptors are located in close proximity to the proposed development, and they are in zones of high contrast, with little natural screening. Four of these receptors are located within the project areas of adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area. In addition, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Hence the high impact rating assigned to these receptors will not affect the overall impact ratings determined in Section 9.</p> <p>Seventeen potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Kraaltjies WEF development, while the remaining two receptors would only experience low levels of visual impact. Eight of these receptors are also located within the project areas of the adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area</p> <p>Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Kraaltjies WEF and associated infrastructure.</p> <p>An overall impact rating was also conducted as part of the VIA in order to allow the visual</p>	

Specialist Study	Findings	Recommendations
	impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Kraaltjies WEF, and associated infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact.	
Geotechnical	<p>The assessment area is underlain by rock units of Teekloof and Abrahamskraal Formations that form the Adelaide Subgroup of the Beaufort Group found in the Karoo Supergroup. Some geotechnical constraints have been identified, primarily shallow bedrock which may cause excavation difficulties, thick transported (alluvium and scree) and localised steep slopes and outcropping rocks. These constraints may be mitigated via standard engineering design and construction measures.</p> <p>No fatal flaws or 'no-go' areas have been identified that would render any assessment areas unsuitable from a geological and geotechnical perspective.</p>	<p>The proposed developments are assessed to have a "Negative Low impact - the anticipated impact will have negligible negative effects and will require little to no mitigation" provided that the recommended mitigation measures are implemented.</p> <p>These include avoiding development on the steeper sections of the site. The remaining mitigation measures provided to minimise the impacts relate to the appropriate engineering design of earthworks and site drainage, erosion control and topsoil and spoil material management. These do not exceed civil engineering and construction best practice.</p> <p>Further intrusive geotechnical investigations should be undertaken to confirm the engineering recommendations provided in this report.</p>
Social	<p>is accepted that an efficient and effective electricity supply is critical to sustain economic growth and development. Indeed, to a large extent, future investment in the country is determined by the availability and security of electricity supplies. The construction of the WEFs is part of the national effort to increase the capacity of electricity generation.</p> <p>Several social impacts were identified, assessed and possible mitigations measures discussed for the proposed project. At the conclusion of the assessment, it can be</p>	<p>In terms of potential social and socio-economic impacts the following recommendations are made:</p> <p>Criminal activity. The possibility of crime escalating in the study area is a concern. Mainstream should liaise as much as possible with local SAPS and or and community policing forums regarding criminal behaviour. Mainstream must develop access protocols with farmers. Mainstream should also consider adequate security at their construction sites. Contractors should receive induction training on the codes of conduct to</p>

Specialist Study	Findings	Recommendations
	<p>confirmed that there are no fatal flaws from a social and socio-economic perspective.</p>	<p>which they must adhere. Construction teams should wear uniforms or carry ID cards.</p> <p>Impacts on surrounding landowners. Mainstream should implement mitigation measures to reduce potential impacts on surrounding landowners and residents' sense of place. Mainstream should establish communication protocols and structures to avoid site-specific sensitivities and property damage.</p> <p>Employment. In the study area and LMs, unemployment is not as severe as in the DM and province, but it is still significant. Mainstream should mandate that contractors use as much local labour as possible, with a target of 100 percent for unskilled jobs.</p> <p>SMEs. As is the case with employment, the proposed project has the potential to generate opportunities for locally based SMEs. It is recommended that, in conjunction with the local and district municipalities, a database be developed with details of services provided by local companies. As far as feasibly possible, Eskom should be required to make use of local service providers able to provide the required goods and/or services.</p> <p>Improvement to socio-economic conditions from improved electricity access. Ensuring electricity connections to households and businesses in need should be the primary objective of the project and an outcome that has the potential to yield the greatest socio-economic benefit. To maximise this benefit, it is recommended that Mainstream continuously engage with the relevant governmental departments to ensure this objective is met. To maximise this benefit, consider the National Planning Commissions (NPC)'s Strategic Infrastructure Plans (SIPS) 9 and 10 objectives.</p>

17. ENVIRONMENTAL IMPACT STATEMENT

South Africa Mainstream Renewable Power Developments (Pty) Ltd is proposing to develop, construct and operate the Kraaltjies and associated infrastructure near the town of Beaufort West in the Prince Albert Local Municipality, which falls within the Central Karoo District Municipality. The overall objective of the proposed development is to generate much needed electricity by means of renewable energy technologies capturing wind energy to feed into the national grid. The use of renewable energy to provide power to South Africa is supported at international, national, provincial and local level. Given South Africa's need for additional electricity generation and the need to decrease the country's dependency on coal-based power, renewable energy has been identified as a national priority, with wind energy identified as one of the readily available, technically viable and commercially cost-effective sources of renewable energy.

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

After consideration of the findings presented in the EIR and based on the preferred layout presented within this report, it is the reasoned opinion of the EAP that the proposed Kraaltjies Wind Energy Facility is acceptable and Environmental Authorisation should be granted.

The specialist assessments were conducted to address the potential impacts relating to the proposed development in order to ascertain the level of each identified impact, as well as mitigation measures which may be required. A summary of the main findings of the specialists are included in **Section 16** above.

The aquatic impact assessment (refer to **Appendix 6**) concluded that high sensitivity aquatic systems could be spanned and or avoided, the technically preferred substation is proposed for approval. The specialist finds no reason to withhold an environmental authorisation of any of the proposed activities, assuming that key mitigations measures are implemented and that all turbine positions have avoided all of the observed aquatic habitat, and that the technically preferred substation location containing the BESS, substations and O/M buildings as well as construction laydown area also avoids these areas.

The terrestrial biodiversity assessment (refer to **Appendix 6**) concluded that based on the findings of the study undertaken, the specialist finds no reason to withhold an environmental authorisation for any of the proposed activities, assuming that key mitigations measures are implemented, and where the proposed layout including; hardstand, BESS, substations and O/M buildings as well as any other temporary works areas, have avoided the relevant sensitivity areas.

The agricultural assessment (refer to **Appendix 6**) concluded that the impact of the proposed development on the agricultural production capability of the site is assessed as being low and therefore acceptable because of the above factors. From an agricultural impact point of view, it is recommended that the development be approved.

The avifaunal assessment (refer to **Appendix 6**) concluded that the Kraaltjies WEF will have a moderate impact on avifauna which, in most instances, and could be reduced to a low impact through appropriate mitigation. The alternative substations (inclusive of the laydown areas) are all situated in essentially the same habitat, i.e. Karoo scrub. The habitat is not particularly sensitive, as far as avifauna is concerned, therefore any of the alternative locations will be acceptable. No fatal flaws were discovered in the course of the onsite investigations. The development is therefore supported, provided the mitigation measures listed in this report are strictly implemented.

The bat assessment (refer to **Appendix 6**) concluded that the overall potential negative impact of the proposed Kraaltjies WEF on bats, combined for all the development phases, is predicted to be Medium Negative without mitigation, and Low Negative with mitigation. Based on the findings of the one-year pre-construction monitoring undertaken at the proposed up to 240 MW Kraaltjies WEF project site, the bat specialist is of the opinion that no fatal flaws exist which would prevent the construction and operation of the WEF. Environmental Authorisation may thus be granted, subject to the implementation of the recommendations made in this report.

The Archaeology impact assessment (refer to **Appendix 6**) concluded that the overall impact of the Kraaltjies WEF, on the heritage resources, is seen as acceptably low after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be granted environmental authorisation. This finding in addition to the implementation of a chance finds procedure, as part of the EMPr, will mitigate possible impacts on unidentified heritage resources.

The Palaeontology impact assessment (refer to **Appendix 6**) concluded that the proposed Kraaltjies WEF and associated Infrastructure development is assigned an overall impact significance rating (Construction Phase) of NEGATIVE MEDIUM without mitigation and NEGATIVE LOW following mitigation. Residual negative impacts may be partially offset by improvements to the local palaeontological database as a result of professional mitigation of chance fossil finds. No significant further impacts on fossil heritage resources are anticipated in the

planning, operational and decommissioning phases. The No-Go Option is likely to have a neutral impact significance. Anticipated cumulative impacts in the context of several planned or authorized renewable energy projects in the region is assessed as **NEGATIVE MEDIUM** without mitigation and **NEGATIVE LOW** after mitigation. These cumulative impacts fall within acceptable limits. The proposed WEF and associated Infrastructure development is not fatally flawed and, on condition that the recommended mitigation measures are included within the relevant EMPr and implemented in full, there are no objections on palaeontological heritage grounds to the granting of Environmental Authorisation for the Kraaltjies WEF project.

The Cultural landscape impact assessment (refer to **Appendix 6**) concluded that with the recommended CLA buffers in place and all other recommendations followed, the overall impact to the cultural landscape for the proposed Kraaltjies WEF and associated infrastructure can be reduced from very high to moderate.

The noise assessment (refer to **Appendix 6**) concluded that, based on the modelling results, the impact will be low from a noise perspective. It is recommended that the development receive environmental authorisation.

The transportation impact assessment (refer to **Appendix 6**) concluded that the Kraaltjies WEF and associated infrastructure will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective, provided the recommendations and mitigation measures in the report are implemented. Hence, Environmental Authorisations (EAs) should be granted for the EIA applications.

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

The desktop geotechnical impact assessment (refer to **Appendix 6**) stated that from a geotechnical and geological perspective, no fatal flaws or sensitivities have been identified within or close to the WEF assessment area. It is therefore recommended that the proposed activity be authorised.

The desktop social impact assessment (refer to **Appendix 6**) stated there are unlikely to be fatal flaws from a social and socioeconomic standpoint provided that provided that recommendations are adhered to.

No location alternatives are being considered for the Kraaltjies WEF as these sites were selected prior to the commencement of the EIA Process. The layout that was prepared for the Kraaltjies WEF has been assessed by specialists to identify potential impacts that may arise from the development. Based on the findings of the specialists, the potential impacts identified and the outcomes of the public participation process of the Scoping Phase, the layout has been designed to avoid environmental no-go areas. This final layout put forward for authorisation has been further assessed by all specialists (refer to Impact Tables in **Section 14.3** and findings and recommendations in **Section 16**). No further layout alternatives have been considered as part of the EIA process. Impact assessments have been undertaken and specialist recommendations have been accommodated in the proposed final layout for authorisation. No technology alternatives will be considered. The choice of turbine to be used will ultimately be determined by technological and economic factors at a later stage.

Section 15 provides a summary of the positive and negative impacts associated with the proposed project.

18. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) AND CONDITIONS TO BE INCLUDED IN ENVIRONMENTAL AUTHORISATION (EA)

In accordance with Appendix 4 of the EIA Regulations, 2014 (as amended), an EMPr has been included within the EIA. The EMPr includes the impact management measures formulated by the various specialists and the recording of the proposed impact management outcomes for the development have also been included in the EMPr (**Appendix 9**).

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

- All of the mitigation measures identified in this EIA Report (**Section 14.3**) must be made conditions of the authorisation.
- It is important that all of the listed mitigation measures are costed for in the construction phase financial planning and budget so that the contractor and/or developer cannot give financial budget constraints as reasons for non-compliance.
- All feasible and practical mitigation measures recommended by the various specialists must be incorporated into the Final Environmental Management Programme (EMPr) and implemented, where applicable;
- The specialist recommendations included in Section 16 must be made conditions of the authorisation.
- Where applicable, monitoring should be undertaken to evaluate the success of the mitigation measures recommended by the various specialists.
- The activity-specific construction EMPr must be adhered to.
- An independent Environmental Control Officer (ECO) must be appointed by the applicant to monitor the implementation of the construction EMP. The ECO should undertake regular site inspections and compile an environmental audit report.

19. FINAL PROPOSED ALTERNATIVE WHICH RESPONDS TO THE IMPACT MANAGEMENT MEASURES, AVOIDANCE, AND MITIGATION MEASURES IDENTIFIED THROUGH THE ASSESSMENT.

The final proposed alternative is the layout that has been assessed in this report (refer **Section 14.4** and **Appendix 3**) and proposed for environmental authorisation and approval.

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

- The applicant limit total noise levels to less than 45 dBA, it is recommended that the Kraaltjies WEF be authorized (from an acoustic perspective).
- A bat specialist must be appointed before the Commercial Operation Date (COD).
- A minimum of two year's operational bat monitoring must be conducted after the commencement of operations at the proposed WEF, as per the guidance of the latest operational South African Bat Assessment Association (SABAA) guidelines.

21. UNCERTAINTIES, ASSUMPTIONS AND GAPS IN KNOWLEDGE

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

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

22. AUTHORISATION OF THE PROPOSED KRAALTJIES WEF PROJECT.

The final layout for the Kraaltjies WEF has been designed to avoid no-go features on site that have been identified through the various specialist studies that have been undertaken, including for integration of all specialist recommendations as has been required by the specialists. No fatal flaws were identified by the specialists who have undertaken their respective assessment for the project. Whilst it is acknowledged that the project will result in negative impacts, these can be mitigated to acceptable levels.

Based on the findings of the specialist studies and this assessment, provided further comments and concerns are not raised during the pending public participation process, the EAP has no reason to recommend that the project not be authorised, provided that the mitigation measures are adhered to. The conditions to be included in the Environmental Authorisation for the construction phase are listed in **Section 14.3.2** above.

The environmental authorization should be valid for a period of 10 years.

23. EAP DECLARATION

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

24. DEVIATIONS FROM THE APPROVED SCOPING REPORT

Following the submission of the Scoping Report, and the acceptance thereafter, the client designed a detailed layout which shows the turbine location and supporting infrastructure. The infrastructure, except for the substation locations, were included in the Scoping Phase report. The designed layout includes the following:

- New on-site substation locations located outside of highly sensitive areas as identified by the specialists.
- Internal roads
- The turbine numbers and locations.
- All proposed supporting infrastructure (on-site substations (including IPP & Eskom portions), BESS, construction laydown area, O&M buildings, guard house etc.).

The final layout which included turbine positions, roads, the substations, construction laydown area, O&M buildings, BESS and guardhouse was included in the draft EIA Report for commenting. Stakeholders, I&APs and commenting authorities were given a chance to review the additional information and the final layout has been put forward for approval.

25. INFORMATION REQUIRED BY CA (IF APPLICABLE)

Currently not applicable.

26. CONCLUSION

This EIA Report has covered activities and findings related to the scoping and EIA process for the proposed Kraaltjies WEF Project. Professional experience, specialist knowledge, relevant literature and local knowledge of the area have all been used to identify the potential issues associated with the proposed project. No fatal flaws were identified during the EIA Phase. In conclusion, SiVEST, as the independent EAP, is therefore of the view that:

- The site location and project description can be authorised based on the findings of the suite of specialist assessments;
- A cumulative impact assessment of similar developments in the area was undertaken by the respective specialists. Based on their findings, majority of the cumulative impacts associated with the proposed development can be kept either low or medium after the implementation of mitigation measures with the exception of one high.

Through the implementation of mitigation measures, together with adequate compliance monitoring, auditing and enforcement thereof by the appointed Environmental Control Officer (ECO) as well as the competent authority,

the potential detrimental negative impacts associated with the proposed development can be mitigated to acceptable levels.



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