

**FINAL SCOPING REPORT**

**PROPOSED BOTTERBLOM WIND ENERGY FACILITY  
AND ASSOCIATED INFRASTRUCTURE ON THE REMAINDER OF  
THE FARM SOUS 226, NEAR LOERIESFONTEIN IN THE  
NORTHERN CAPE**

**OCTOBER 2021**

**NAME OF APPLICANT: FE BOTTERBLOM (PTY) LTD**

**PREPARED BY: Enviro-Insight CC**

## PROJECT DETAILS

<b>REPORT TITLE:</b>	PROPOSED BOTTERBLOM WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE ON THE REMAINDER OF THE FARM SOUS 226, NEAR LOERIESFONTEIN IN THE NORTHERN CAPE
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<b>EAP:</b>	ENVIRO-INSIGHT CC CORNÉ NIEMANDT <i>Pr.Sci.Nat.</i> IAIAsa MEMBER
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## EXECUTIVE SUMMARY

### PROJECT OVERVIEW

FE Botterblom (Pty) Ltd (hereafter the Applicant) is proposing the development of a wind energy facility (WEF) and associated infrastructure on a site located approximately 53 kilometers (km) north of Loeriesfontein in the Northern Cape province of South Africa. The proposed development will have a generation capacity of up to 240MW which will feed into the National Grid. This report comprises the Final Scoping Report (FSR) for the proposed development of **Botterblom WEF**.

The proposed study area for the WEF development is located approximately 53km north of Loeriesfontein, 85 km west of Brandvlei and 160 km southeast of Springbok in the Northern Cape. The site can be reached via unsurfaced Granaatboskolk / Zout Dwaggas Road, which branches off the R357. The Botterblom WEF footprint is approximately 5 736 hectares (ha) and will be located on a Portion of the Remainder of the Farm Sous 226. The Khobab WEF is located directly north while Loeriesfontein2 WEF is located north-east of the study area.

The Botterblom WEF will consist of up to 35 wind turbines, with a generation capacity of between 4.5 and 7.5 MW per turbine, depending on the available technology at the time. Each turbine will have a hub height of up to 150m and a rotor diameter of up to 175m. The final turbine model to be utilised will only be determined closer to the time of construction, depending on the technology available at the time. Additional ancillary infrastructure to the WEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), foundations to support turbine towers, internal/ access roads linking the wind turbines and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) with the relevant stormwater infrastructure and gates constructed as required. The perimeter of the proposed WEF may be enclosed with suitable fencing. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin will also be established.

Additionally, a power line with a capacity of up to 132kV is required. At this stage, options are still being considered for either the construction of a new line to feed into the Helios substation or connect with existing lines. This associated electrical infrastructure will require a separate Environmental Authorisation and is being conducted as a part of a separate Basic Assessment (BA) process. More details will be provided in the Final Environmental Impact Assessment Report (FEIAR).

In terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the Environmental Impact Assessment (EIA) Regulations (2014, as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Botterblom WEF.

Enviro-Insight CC (hereafter Enviro-Insight) has been appointed to undertake the Scoping & EIA (S&EIA) process for the WEF, on behalf of the Applicant. The S&EIA process will determine the biophysical, social and economic impacts associated with undertaking the proposed activities. Given that energy related projects have been elevated to national strategic importance in terms of the S&EIA process, the proposed WEF requires authorisation from the National Department of Forestry, Fisheries and the Environment (DFFE) as the Competent Authority (CA), acting in consultation with other spheres of government.

## ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

As noted above, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the EIA Regulations (29014, as amended), promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017, a full Scoping and EIA Process is required for the construction of the proposed Botterblom WEF.

The need for the full Scoping and EIA is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

**“The development of a facility or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure”.**

Chapter 2 of this Final Scoping Report contains the detailed list of activities contained in R327, R325, and R324 (EIA Regulations, 2014, as amended) which may be triggered by the various project components and thus form part of the S&EIA Process.

The purpose of the S&EIA is to identify, assess and report on any potential impacts the proposed project, if implemented, may have on the receiving environment. The impact assessment phase needs to show the CA (DFFE) and the project Applicant (FE Botterblom) what the consequences of their choices will be in terms of impacts on the biophysical, social and economic environment and how such impacts can, as far as possible, be avoided or mitigated and managed.

## SCOPING PHASE

The purpose of the scoping report is to identify and evaluate the main issues and potential impacts of the proposed development at a detailed desktop level based on existing information.

The scoping phase is conducted as the precursor to the EIA phase during which:

- Project and baseline environmental information is collated. Baseline information for the scoping report is gathered through visual inspections during field visits of the proposed project area and surroundings, desktop studies which include GIS mapping, and review of existing reports, guidelines and legislation.
- Landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which may be affected by the project, or that may have an interest in the environmental impacts of the project are identified.
- Interested and affected parties (I&APs) are informed about the proposed project.
- CA is consulted to confirm legal and administrative requirements.
- Environmental issues and impacts are identified and described.
- Development alternatives are identified and evaluated, and non-feasible development alternatives are eliminated.
- The nature and extent for further investigations and specialist input required in the EIA phase is identified.
- The draft and final scoping reports are submitted for review by authorities, relevant organs of state and I&APs.
- Key I&AP issues and concerns are collated into an issues and response report for consideration in the EIA phase.

Issues raised in response to the Draft Scoping Report has been captured in a Comments and Response Report as an appendix in this Final Scoping Report (FSR), which will be submitted to the CA for decision-making (i.e. approval or rejection). If approved, it marks the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

## PUBLIC PARTICIPATION PROCESS

A Public Participation Plan was submitted to the DFFE case officer on 6<sup>th</sup> of April 2021 and was approved on the 7<sup>th</sup> of April 2021 (Appendix C).

The Public Participation Process (PPP) commenced on 30 April 2021 with an advertisement in a local newspaper in order to notify and inform the public of the proposed project and invite I&APs to register. All individuals who registered for this project has been added to the I&AP list, provided that they have given the correct and complete contact details in order to receive communications for this project. The notification procedure included (Appendix E):

- Newspaper advertisement: published in the Noordwester on 30 April 2021;
- Site Notices: erected at prominent points along the property boundaries and noticeable places on 8 May 2021; and
- Emails were composed and sent to the identified authorities, adjacent landowners, and I&APs that have registered thus far. I&APs were provided the opportunity to comment on the Background Information Document (BID).

The DSR was released for a 30-day commenting period which ended on the 1<sup>st</sup> of October 2021. Comments on the DSR have been included in this Final Scoping Report which will be submitted to DFFE for decision-making.

## SCREENING TOOL REPORT

The Minister of Environment, Forestry and Fisheries, gave notice that the submission of a report generated from the national web-based environmental screening tool<sup>1</sup>, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.

Based on the generated screening report, all environmental theme sensitivities are indicated below.

Theme	Very High sensitivity*	High sensitivity*	Medium sensitivity	Low sensitivity
Agriculture Theme				
Animal Species Theme				
Aquatic Biodiversity Theme				
Archaeological and Cultural Heritage Theme				
Avian (Wind) Theme				
Bats (Wind) Theme				
Civil Aviation (Wind) Theme				
Defence (Wind) Theme				
Flicker Theme				
Landscape (Wind) Theme				
Noise Theme				
Palaeontology Theme				

<sup>1</sup> <https://screening.environment.gov.za/screeningtool/#/pages/welcome>



	<p>River, while the smaller scattered ESAs throughout the site are pans (natural non-FEPA Wetlands). From a Terrestrial Biodiversity perspective, these aquatic features represent important ecosystem functions and processes in the landscape, as they create niche habitats for both flora and fauna species.</p>
	<p>Development is likely to generate low impacts of local significance only. Cumulative impacts as a result of the development are likely to be relatively low as the footprint of the development is quite low and the intensity of development in the wider area is still low despite the fact that a node of renewable energy is developing around the Helios substation. With the application of relatively simple mitigation and avoidance measures (for example, avoid CBAs and ESA), the impact of the Botterblom WEF can be reduced to a medium to low overall level.</p>
<p><b>Sensitive Plant Species Assessment</b></p>	<p>Two plant Species of Conservation Concern (SCC), namely Sensitive Species 44 (VU) and <i>Hoodia gordonii</i> (DDD) has been recorded on the study area. Only one individual of Sensitive Species 44 was recorded, which is currently not impacted on by the layout design and should be protected in situ. With the application of avoidance measures (for Sensitive Species 44) and relatively simple mitigation (for example, search and rescue with permit applications), the impact of the Botterblom WEF can be reduced to a low overall level.</p>
<p><b>Sensitive Animal Species Assessment</b></p>	<p>No sensitive fauna (mammals, herpetofauna or invertebrates) is expected to occur on the study area, as confirmed during the site verification. Accordingly, the impact of the Botterblom WEF on animals is considered to be low.</p>
<p><b>Avifauna</b></p>	<p>Only two seasons (early spring and summer) as part of the 12 month preconstruction monitoring is included in the scoping report. A total of 23 priority species are expected to occur on and surrounding the study area, of which 14 have been recorded within the study area to date during this study. According to the literature, 15 Red-Listed species are known to occur in the region with nine species confirmed during the completed surveys, representing a very high success rate given the short study period (and considering the absence of migrants). Of the expected species and according to Taylor <i>et al.</i> (2015), two of the species are Endangered, seven of the species are Vulnerable species and four are Near-Threatened. Activity and abundance of priority species and SCC were found to be medium to high on the proposed Botterblom WEF extent.</p> <p>The proposed Botterblom WEF will have a variety of impacts on avifauna which range from low to high. One of the noticeable sightings includes a martial eagle nest on the study area. The specialist strongly recommended that a Martial Eagle specialist (we propose Dr. Gareth Tate of the EWT) should be consulted to investigate the potential mitigation option of removing the Martial Eagle nest when no egg or fledgling is present so that the adults may disperse and rebuild a nest further away from the proposed Botterblom WEF and the other existing and planned WEFs in the immediate vicinity. The specialists indicated that should the eagle nest not be removable (pending input from a species-specialist) a precautionary 3 km buffer for this project would be sufficient, but only if the accompanied mitigation measures are implemented (this will be further expanded on in the EIA report).</p>

	<p>Areas of drainage lines and natural vegetation which are vital to maintaining populations of habitat obligate sensitive species (such as Sclaters' Lark and Red Lark) are associated to have a high probability of collision consistently throughout the year. Furthermore, natural drainage line vegetation represents an important habitat to maintain natural geohydrological processes of the PAOI. A 50 m buffer around these areas must be considered NO-GO where no turbines and associated infrastructure may be located. A 200 m buffer is also applied around seasonally inundated watercourses in the PAOI, as these features attract birds under certain conditions and could be the only locations where certain sensitive species such as the ducks, herons, storks and water birds are likely to occur. These areas must be avoided by the developer where no turbines and associated infrastructure may be located. Several of the proposed turbine positions and associated infrastructure coincide with areas currently demarcated as sensitive features within the prescribed buffers and consequently may have to be relocated outside of these sensitive areas. The layout will have to be carefully re-evaluated in order to mitigate against negative interaction with priority species such as Red Lark.</p>
<p><b>Bats</b></p>	<p>Only two seasons (early spring and summer) as part of the 12 month preconstruction monitoring is included in the scoping report.</p> <p>Data was collected from three 7m masts and one meteorological mast recording at 7m, 50m and 100m. The data from September 2020 to January 2021 was analysed by means of identifying the bat species detected by the monitoring systems and the periods of high bat activity. A number of technical failures occurred with the monitoring systems, but these failures should not compromise the study since an adequate amount of data was recorded in this period.</p> <p>Four bat species were recorded by the bat detectors during the Sep 2020 – Jan 2021 survey period, all of which are listed as Least Concern on the IUCN Red Data List, are not regarded as ToPS species, are not CITES listed and are not endemic to South Africa (IUCN, 2020). <i>Tadarida aegyptiaca</i> was the most common bat species recorded followed by <i>S. petrophilus</i>. <i>Eptesicus hottentotus</i> and <i>L. namibensis</i> are clutter-edge foragers, and the lack of a more complex vegetation structure does not suite their foraging requirements. As such it is expected that their presence in the project area will be limited. All four of these species will roost in rock crevices and as such it is expected that they face similar restrictions in terms of roosting habitat available.</p> <p>Monthly activity patterns show activity levels of <i>T. aegyptiaca</i> increasing from September with a peak during November after which it declines substantially. Activity for <i>S. petrophilus</i> is relatively constant across all months. Seasonal activity of both <i>T. aegyptiaca</i> and <i>S. petrophilus</i> is higher during spring than summer. Before definite conclusions can be drawn from these data, a full years' worth of data will need to be acquired to further investigate variation in activity which could be indicative of migratory patterns, but the current data would suggest that <i>T. aegyptiaca</i> move through the area during November as part of a migratory route, perhaps using it as a resting stop.</p>



	<p>In total, five echolocation calls were recorded during active monitoring, four of <i>T. aegyptiaca</i> and one <i>Laephotis capensis</i>, but only two of these were within the AOI, both of which were recorded close to the train tracks transecting the area. <i>L. capensis</i> was not recorded on any of the stationary bat detectors indicating very low abundance. It is not a red listed species or endemic to South Africa and is considered by the specialist to be at low risk from turbine related mortality due to them being clutter-edge foragers and not often foraging high above ground level or in the rotor sweep zone</p> <p>Large structures that have thus far been investigated for large or medium roosts on or near the project area showed no indication of bats present. In addition, the surrounding topography does not lend itself to cave structures and no mention was made of large roosts or caves in any previous surveys done for the area. Nine potential roost sites were investigated for the presence of bats, and only one bat was confirmed during day inspections. An attempt will be made to investigate the potential roost sites located in the AOI at dusk during future site visits to determine acoustically if bats are present.</p> <p>Upon completion of the bat monitoring and subsequent updating of the sensitive areas map, the construction layout of the wind turbines and additional infrastructure can commence to avoid all sensitive areas. Currently, the predicted sensitive areas are around the dry riverbeds in the eastern part of the site, but a more comprehensive data set which will be obtained during the upcoming surveys, will provide a better indication of the sensitive areas.</p> <p>From the available data collected, the construction of a WEF on the proposed AOI will have a Medium-High Risk of impacting the bat population in the area <b>before</b> mitigation measures have been put in place, but this statement is currently only valid for the spring and summer months. Currently, after mitigation measures have been followed this risk will be reduced to Medium. This will be further investigated and discussed in the EIA report.</p>
<p><b>Aquatic Biodiversity</b></p>	<p>WaterMakers was appointed by Enviro-Insight Consulting as independent specialists to conduct the relevant wetland and riparian related studies in order to assist the facilitation of the required environmental authorisation and water use licence processes.</p> <p>A total of five riparian networks were delineated within the study area and within 500m from the study area as well as sections further downstream of the study area. All five riparian networks feed into the Leeuberg and Klein-Rooiberg Rivers which joins the Krom River downstream. In addition there were several non-FEPA wetlands indicated on the NFEPA database that was investigated. Only the terrain unit indicator was confirmed for the indicated NFEPA database depression wetlands. None of the other three wetland indicators were present. However, these depressions do hold water for a few days a year and could act as potential temporary habitat for various faunal species, however, water is likely not retained for a long enough period for redox morphology to develop, thus they are not likely wetlands. Following a cautionary approach, these features are termed 'riparian/ephemeral depressions', with some of the depressions being isolated while a cluster of depressions are linked via riparian channels. Further infield research is necessary to establish whether these features should indeed be classified as</p>

	<p>watercourses and thus have regulatory standing. For now, a cautionary approach stands in order to facilitate an environmentally friendly and sustainable planning process. The same cautionary and conservative approach was taken where there were doubt between differentiating between A section and B section channels, with A section channels likely included in the current delineation, especially on the highest lying areas where channels often do not carry baseflow.</p> <p>Findings of the VEGRAI vegetation assessment conducted on riparian units identified within the study area indicated that riparian habitat associated with the study area were regarded as being in a largely natural state (i.e. Ecological Category B). There are a few small areas that has been highly impacted through grazing practices (e.g. artificial waterholes, overnight camps etc), but collectively these heavily impacted zones form a very small percentage of the total riparian habitat.</p>
	<p>In terms of ecological importance and sensitivity, riparian habitat (Riparian 1 to Riparian 9) within the study area was designated as sensitive as a result of the ecological and functional values attributed to riparian areas in general, legal regulations and requirements as well as the supporting ecological services afforded to the downstream ecosystems.</p> <p>Determination of the preliminary buffer requirements for riparian features associated with the proposed study area followed the approach of Macfarlane &amp; Bredin (2016). Preliminary buffer requirements for the identified watercourse were determined to be 40m from the edge of the delineated riparian areas. Further field work with regards to separating less sensitive A section channels from B section riparian channels will likely lead to reduced buffer distances and or not be applicable in some instances.</p> <p>Preliminary impact considerations identified destruction of water courses and associated habitat, surface water pollution including sedimentation as well as increased erosion, loss of wetland functionality and decreased downstream water quality as the major potential impacts during the construction and operational phase. Several general and specific mitigation measures were proposed in order to reduce negative impacts and incorporate some potentially positive impacts from the proposed development.</p> <p>Considering the type of development proposed and assuming that the necessary mitigation measures are appropriately designed and applied, the development is not likely to impact on the FEPA catchment classification associate with the study area.</p>
<p><b>Agriculture</b></p>	<p>The aridity of the area is a significant agricultural constraint that seriously limits the level of agricultural production (including grazing) which is possible across the site. Shallow, sandy soils on underlying rock or carbonate hardpan are a further agricultural limitation.</p> <p>As a result of these limitations, the study area is unsuitable for cultivation and agricultural land use is limited to low density grazing. The majority of land within the development area is classified as low agricultural sensitivity but includes smaller patches of medium sensitivity.</p>

	<p>Three potential negative agricultural impacts were identified: loss of agricultural land use, land degradation, and impacts of dust, but all are of low significance. One positive agricultural impact was identified, namely increased financial security for farming operations. It is also of low significance.</p> <p>The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.</p>
	<p>The conclusion of the assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the land is of very low agricultural potential, the amount of agricultural land loss is within the allowable development limits, and that the proposed development poses a low risk in terms of causing soil degradation.</p> <p>From an agricultural impact point of view, it is recommended that the proposed development be approved.</p>
<p><b>Noise</b></p>	<p>Ambient sound levels were not measured at this project site, but based on numerous measurements collected in similar areas and adjacent sites, it is expected that ambient sound levels will be typical of a rural noise district with faunal sounds dominating both night and day. Most farmers in the area will consider this to be naturally quiet. Considering the developmental character, it was selected to assign an acceptable noise rating level of a rural noise district (as per SANS 10103:2008). Typical night-time sound levels will be less than 35 dBA with daytime sound levels being less than 45 dBA (during no, or low wind conditions).</p> <p>Residential areas and potential noise-sensitive developments/receptors were identified using tools such as Google Earth® as well as the potential sensitive areas (using the online Screening Tool. A review of available aerial images, as well as the information gained during the site visits (13 June 2011; 17 June 2016) highlighted that there are no dwellings that can be used for temporary or permanent residential purposes.</p> <p>This report determines, using administrative means, whether the proposed development could have any significant acoustical implications considering a questionnaire as proposed by SANS 10328:2008. As all the questions are negative (i.e. not applicable), it is unlikely that the planned development will present a noise disturbance. As recommended by SANS 10328:2008, a scoping investigation and an environmental noise impact investigation may not be required.</p> <p>It is therefore the opinion of the author that there exists a low potential for a noise impact and that no further Scoping or other acoustical studies would be required for the proposed WEF.</p> <p>It is therefore recommended that the Botterblom WEF would be approved from a noise perspective. No specific mitigation measures regarding noise, additional noise measurements or additional conditions regarding noise are recommended for inclusion in the Environmental Impact Assessment (EIA) or Environmental Management Programme report (EMPr).</p>

<p><b>Visual and Flicker</b></p>	<p>The WEF site itself is located at an average elevation of 932 m.a.s.l. and has an even slope to the south towards the Klein-Rooiberg and the Rooiberg Rivers. These two non-perennial rivers and the dry Sandkraal River all flow into the Krom River. These rivers are only occasionally flooded during infrequent rainfall periods and are therefore dry riverbeds for most of the year. Other hydrological features in the study area are non-perennial pans to the north. Some of the larger pans include:</p> <ul style="list-style-type: none"> <li>• Kannes se Pan</li> <li>• Dwaggas Salt Pan</li> <li>• Boegoefontein Pan</li> <li>• Bitterputs Pan</li> <li>• Kareedoring Pan</li> <li>• Brakpan</li> </ul> <p>Some of these pans are home to the limited industrial activities within the region, namely salt mining, e.g. at Dwaggas Pan and Boegoefontein Pan. Other than these relatively small salt mining operations, the only industrial infrastructure includes the Sishen to Saldanha iron ore railway line, the Helios Substation, the Loeriesfontein and Khobab WEFs, and the Aries to Helios 400kV and Helios to June 400kV power lines. The railway line, power lines and the Loeriesfontein secondary (gravel) road all traverse the proposed Botterblom development site.</p> <p>In spite of the limited industrial activity, it should be noted that the region has attracted a large number of renewable energy applications (both wind and solar), most of which have been authorised.</p> <p>Other than the infrastructure and activities mentioned previously, the dominant land use (at present) within the region is sheep farming. There is very limited agricultural activity (dryland cultivation) due to the limited rainfall (less than 300mm per annum) and arid climate. The predominant land cover types include seasonal grassland, bare sand surfaces and Low Shrubland, mainly to the south. Some Woodland occurs along the dry riverbeds and drainage lines to the south-west.</p> <p>Overall, the region has a predominantly undeveloped, rural and natural character, with scattered isolated homesteads or farm settlements occurring within the study area. These are generally located at great distances from each other. The region has a population density of less the 1 person per km<sup>2</sup>.</p> <p>The result of the preliminary viewshed analyses for the proposed WEF envisaged that the WEF structures would be easily and comfortably visible to observers (i.e. people travelling along the Loeriesfontein secondary road, residing at homesteads or visiting the region), especially within a 5-10km radius of the WEF and would constitute a high visual prominence, potentially resulting in a high visual impact.</p> <p>Anticipated issues related to the potential visual impact of the proposed Botterblom Wind Energy Facility include the following:</p>
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	<ul style="list-style-type: none"> <li>• The visibility of the facility from, and potential visual impact on observers travelling along the secondary (local) roads within the study area.</li> <li>• The visibility of the facility from, and potential visual impact on farm settlements and homesteads (rural residences) within the study area.</li> <li>• The potential visual impact of the facility on the visual character and sense of place of the region, with specific reference to the vast landscape, open plains and the scenic mountains (Klein and Groot Rooiberge).</li> <li>• The potential visual impact of the facility on tourist routes or tourist destinations (e.g. tourist facilities within the study area) if applicable.</li> <li>• The potential visual impact of the construction of ancillary infrastructure (i.e. internal access roads, buildings, BESS (if applicable), etc.) on observers in close proximity to the facility.</li> <li>• The visual absorption capacity of the natural vegetation (if applicable).</li> <li>• Potential cumulative visual impacts (or consolidation of visual impacts) with specific reference to the construction of the WEF adjacent to the operational Khobab and Loeriesfontein WEFs and other authorised renewable energy applications in the study area</li> <li>• The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.</li> <li>• The potential visual impact of shadow flicker.</li> <li>• Potential visual impacts associated with the construction phase.</li> <li>• The potential to mitigate visual impacts and inform the design process.</li> </ul> <p>It is envisaged that the issues listed above may potentially constitute a <b>significant visual impact</b> at a local and/or regional scale. These need to be assessed in greater detail during the EIA phase of the project.</p>
<p><b>Heritage</b></p>	<p>HCAC was appointed to conduct a Heritage Impact Assessment for the project, this report is for the scoping phase of the project and is based on a desktop study.</p> <p>A marked paucity of Stone Age material is evident for the greater study area (Morris 2013; van der Walt 2012 and Fourie 2011). Closer to the study area, on the crests of small hills several LSA sites is recorded (van Schalkwyk 2011, Webley and Halkett 2012, Orton 2014, van der Walt 2014). Further away, in the area around Klawervlei and Waterkuil (Morris 2013), later Stone Age sites on dunes at the fringes of pans are plentiful. From these studies, it is clear that the distribution of sites may be highly structured relative to resources, principally water (e.g., Beaumont et al. 1995) and on the crests of small hills possibly providing vantage points. Recorded features in the study area include Later Stone Age sites with a background scatter of Middle Stone Age artefacts (Beaumont et al. 1995). Recorded lithics are mainly on cryptocrystalline quartz probably derived from numerous dolerite dykes and sills in the Loeriesfontein area, associated with several breccia pipes described in the literature. These hydrothermal vent complexes are likely to have produced a variety of fine-grained siliceous materials,</p>

	<p>including cryptocrystalline quartz that was preferred for tool making by Stone Age communities. In addition to the Stone Age sites a historical farmstead, and memorial is also on record for the study area.</p> <p>It is recommended that the study area should be subjected to Heritage Impact Assessment and during this study the potential impact on heritage resources will be determined as well as levels of significance of recorded heritage resources. The HIA should also provide management and mitigation measures should any significant sites be impacted upon, ensuring that all the requirements of the SAHRA are met. The study area is of moderate to high paleontological sensitivity and according to the SAHRIS palaeontological sensitivity map must be subjected to a desktop palaeontological assessment in the impact assessment phase.</p>
<p><b>Socio-economic</b></p>	<p>Based on the review of key planning documents the development of renewable energy, including WEF, are supported nationally, provincially and at the local government levels. At the local government level this should not be at the expense of the natural beauty of the area.</p> <p>The preliminary identification of potential impacts is made based on the desktop information gathered and the review of documentation including EIAs for similar projects in the area, and from experience gained from undertaking similar assessments. A full assessment of the potential impacts will be made in the EIA phase of the project once the project has been announced and field work is complete.</p> <p>The following <u>construction phase</u> impacts can be expected for the project:</p> <p>Potential positive impacts:</p> <ul style="list-style-type: none"> <li>• Creation of employment;</li> <li>• Business opportunities;</li> <li>• Opportunity for skills development; and</li> <li>• On-site training.</li> </ul> <p>Potential negative impacts</p> <ul style="list-style-type: none"> <li>• Impacts associated with the presence of construction workers on site and in the area;</li> <li>• Influx of job seekers to the area;</li> <li>• Impacts on farmers;             <ul style="list-style-type: none"> <li>○ risk of stock theft,</li> <li>○ damage to farm infrastructure associated with construction workers,</li> <li>○ increased risk of fires;</li> </ul> </li> <li>• Impact of construction vehicles, including:             <ul style="list-style-type: none"> <li>○ damage to roads,</li> <li>○ safety and</li> <li>○ dust;</li> </ul> </li> <li>• Impact on farming activities;</li> <li>• Additional pressure on services offered by the local municipality;</li> <li>• Loss of sense of place;</li> <li>• Noise, dust and visual impacts.</li> </ul> <p>Based on the findings from of SIAs for other wind energy projects the key social issues affecting the <u>operation phase</u> are likely to include:</p>

	<p>Potential positive impacts</p> <ul style="list-style-type: none"> <li>• The establishment of renewable energy infrastructure and generation of clean, renewable energy;</li> <li>• Creation of employment and business opportunities;</li> <li>• Opportunities for skills development and training; and</li> <li>• Generation of income for landowner.</li> </ul> <p>Potential negative impacts</p> <ul style="list-style-type: none"> <li>• The visual impacts and associated impact on sense of place;</li> <li>• Impact on property values;</li> <li>• Potential impact on tourism;</li> <li>• Noise; and</li> <li>• Visual impacts.</li> </ul> <p>The development of the proposed WEF will create employment, training and business opportunities during both the construction and operation phases of the project. The potential negative impacts associated with the construction phase can be mitigated if mitigation measures are implemented. Detailed mitigation measures will be outlined in the Social Impact Assessment Report.</p> <p>The aim of the socio-economic impact assessment (SIA) will be to provide an accurate representation of the social, cultural and economic conditions of the people surrounding the proposed project, to assess the impact on these conditions and provide mitigation measures for any identified impacts.</p> <p>This study will employ a predominantly qualitative approach (i.e. interviews and focus group discussions) to gather data, this is dependent on whether in person consultations are permitted under the COVID 19 government regulations.</p> <p>Data collection will be done by the following means:</p> <p>Household interviews for those affected by the proposed project to develop a social profile. The following variables will be considered during the design of the interview framework:</p> <ul style="list-style-type: none"> <li>• Access to services;</li> <li>• Agricultural practices and land use;</li> <li>• Livelihoods; and</li> <li>• Perceptions and attitudes towards the proposed Project.</li> </ul> <p>The methodology for the impact assessment phase will be finalised when the social environment has been more clearly defined. The quantitative data will be gathered through interaction with affected communities and local key people will be used to compile a detailed report describing the socio-economic environment for the area affected by the proposed WEF.</p>
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	<p>The proposed development will also represent an investment in clean, renewable energy infrastructure for the country which will go some way to offset the negative environmental and socio-economic impacts associated with a coal-based fossil fuel energy generation. Renewable energy, including WEF, also addresses climate change and assists the country in meeting climate change reduction goals.</p> <p>The potential visual, noise and dust impacts will be assessed from these specialist studies to be undertaken as part of the EIA. The cumulative impacts on the area's sense of place and assessment of significance of impacts will be informed by the findings of these assessments undertaken for the proposed WEF as part of the EIA</p>
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## PLAN OF STUDY

In line with the relevant legislative requirement, the Plan of Study (PoS) for the EIA phase of the assessment is indicated in this report. Consultation with DFFE will be ongoing throughout this S&EIA process. However, it is anticipated that DFFE will provide relevant comment with respect to the adequacy of this PoS for the EIA, as it informs the scope and scale of the EIR.

The Scoping Phase has identified potential environmental impacts, specialist studies required to assess these impacts and indicated the alternatives that require further discussion and assessment during the EIA phase. The relevant section outlines the proposed PoS which will be conducted for the various environmental aspects during the EIA Phase. It is also important to note that the PoS will also be guided by comments obtained from I&AP's and other stakeholders during the commenting period.

The objective of the EIA phase will be to:

- Identify and assess the environmental (biophysical and social) impacts of the construction, operation, and decommissioning impacts of the proposed development. The cumulative impacts of the proposed development will also be identified and evaluated;
- Alternative activities and locations will be determined and assessed in parallel with the proposed activity;
- Identify and evaluate potential management and mitigation measures that will reduce the negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMP; and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development.

The Impact Assessment Phase has four key elements:

- Specialist Studies: Specialist studies identified during the Scoping Phase and DFFE Screening Report, and any additional studies that may be required by the competent authority, are undertaken as the initial phase of the EIA. The relevant specialists have already been appointed to undertake the various assessments prior to the commencement of the EIA phase in order to identify potential fatal flaws from an early stage in the process and inform the PoS. Specialists will gather baseline information relevant to the study being undertaken and assess impacts associated with the development. Specialists will also indicate areas to be avoided, make recommendations to mitigate negative



impacts and optimise benefits. The resulting information is synthesised into the draft EIAR (with the complete assessment attached to the EIAR) that will be made available to I&APs for review and comment.

- Environmental Impact Assessment Report (EIAR): The main purpose of this Report is to gather environmental information and evaluate the overall impacts associated with the project, to consider mitigation measures and alternative options, and make recommendations in choosing the best development alternative. The EIAR also identifies mitigation measure/management recommendations to minimise negative impacts and enhance benefits. The draft EIAR and associated reports will be made available for public and authority review and comment for a period of 30 days. The availability of the draft EIAR will be communicated to all registered I&APs and will be accessible through various platforms to be confirmed at the time. After comments have been received, the final EIAR will be compiled and submitted to the DFFE for review. This report will assist the DFFE in making an informed decision on whether to grant or reject the proposed development.
- Environmental Management Programme (EMPr): The EMPr provides guidelines to the Applicant and the technical team on how to best implement the mitigation measure/ management recommendations outlined in the EIAR during the construction, operational and decommissioning phase. The EMPr is a law binding document, and once approved it cannot be amended without permission from the DFFE.
- Public Participation Process (EIA Phase): The PPP initiated during the Scoping Phase, is continued. This includes continuous engagement with I&APs and stakeholders which includes consultation meetings, receiving comments, issues and concerns raised by I&APs and the authorities during the review period, and also provides relevant responses to these comments. Comments on the Draft EIAR received from I&APs are included and addressed in the final submitted EIAR in the form of a Comments & Response Report

**NEMA EIA REGULATIONS REQUIREMENTS FOR SCOPING REPORT**

**Appendix 2: Content of the scoping report**

2. (1) scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include—

Appendix 2 Regulation 2	Content as per Appendix 2 of NEMA EIA Regulations 2014 (as amended)	Section
a)	details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae.	1.2
b)	the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	5.1
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; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	5.1 7.1.2 Appendix B
d)	a description of the scope of the proposed activity, including— (i) all listed and specified activities triggered; and (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	2.1 3.4
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;	3

f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	2.3
g)	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 the alternatives considered;	7.1
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	4.3
	(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;	4.3
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	5
	(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;	6.3
	(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;	6.1
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	6.3
	(viii) the possible mitigation measures that could be applied and level of residual risk;	6.4
	(ix) the outcome of the site selection matrix;	Will be completed in EIR
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	7.1	

	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Further assessed in EIA
h)	a plan of study for undertaking the environmental impact assessment process to be undertaken, including—	7
	(i) a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	7.1
	(ii) a description of the aspects to be assessed as part of the environmental impact assessment process;	7.2
	(iii) aspects to be assessed by specialists;	7.3
	(iv) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	6.1
		7.4
	(v) a description of the proposed method of assessing duration and significance;	6.1
		7.4
	(vi) an indication of the stages at which the competent authority will be consulted;	4.3
		7.5
(vii) particulars of the public participation process that will be conducted during the environmental impact assessment process;	7.5	
(viii) a description of the tasks that will be undertaken as part of the environmental impact assessment process;	7.6	
(ix) identify 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.	6.4 – This section will be expanded on in the EIA phase	
i)	an undertaking under oath or affirmation by the EAP in relation to—	Appendix I
	(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) 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;	

j)	an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Appendix I
k)	where applicable, any specific information required by the competent authority; and	Currently, none identified
l)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	Currently, none identified

## TABLE OF CONTENTS

Executive Summary .....	3
Appendices .....	26
List of Figures.....	26
List of Tables.....	28
Abbreviations .....	29
Definitions and Terminology.....	32
1 Introduction.....	35
1.1 Applicant Details.....	37
1.2 The Environmental Impact Assessment Project Team.....	38
1.2.1 Environmental Assessment Practitioner (EAP) .....	38
1.2.2 Specialists .....	38
1.3 Assumptions and Limitations .....	39
1.4 Structure of the Scoping Report .....	40
2 Description of the proposed project.....	40
2.1 Nature and Extent of proposed Botterblom WEF.....	40
2.2 Project development phases .....	43
2.3 Need and Desirability.....	45
2.3.1 National Perspective .....	45
2.3.2 Provincial and Local context.....	46
3 Legal Context .....	47
3.1 National environmental screening tool and Environmental Theme Protocols.....	47
3.1.1 Screening Report .....	47
3.2 Renewable Energy Development Zone .....	48
3.3 Renewable Energy Authorisation Requirements .....	49
3.3.1 Planning Context.....	60
3.3.2 Policy Context .....	60
3.4 Legal Requirements as per the EIA Regulations, 2014 (as amended).....	61

4	Scoping and EIR Process.....	65
4.1	Approach .....	65
4.2	Specialist Assessments .....	67
4.3	Public Participation .....	67
4.3.1	Objectives of Public Participation .....	67
4.3.2	Legislation .....	67
4.3.3	Public Participation Plan as submitted and approved by DFFE .....	68
4.3.4	Identification of I&APs .....	69
4.3.5	Notification and Registration of I&APs.....	70
4.3.6	Background Information Document.....	70
4.3.7	Consultation with I&APs .....	70
4.3.8	Notification of availability of scoping report .....	70
5	Description of the Receiving Environment.....	71
5.1	Regional Area.....	71
5.2	Climate .....	73
5.3	Topography.....	73
5.4	Geology .....	74
5.5	Land Use .....	75
5.6	Terrestrial Biodiversity .....	77
5.6.1	Regional Vegetation .....	78
5.6.2	Northern Cape Critical Biodiversity Areas .....	79
5.6.3	Significant terrestrial landscape features.....	81
5.6.4	Species and important habitats .....	83
5.6.5	Preliminary sensitivity.....	83
5.7	Plant and Animal Sensitive Species .....	84
5.7.1	Sensitive Plant Species.....	86
5.8	Avifauna (Wind) .....	89
5.8.1	Description of Major Bird Habitats .....	89

5.8.2	Observed and Expected Avifauna .....	90
5.8.3	Preconstruction Monitoring main results .....	96
5.8.4	Bird sensitive features .....	99
5.8.5	Martial Eagle Nest Site .....	99
5.9	Bats (Wind) .....	102
5.9.1	Affected Environment .....	102
5.9.2	Field surveys .....	102
5.9.3	Results .....	105
5.9.4	Bat sensitive features .....	108
5.9.5	Potential Impacts .....	110
5.9.6	Discussion and Conclusion .....	111
5.10	Aquatic Biodiversity .....	112
5.10.1	Conclusion .....	114
5.11	Agricultural Potential .....	114
5.11.1	Agricultural Potential .....	115
5.11.2	Agricultural Sensitivity .....	115
5.11.3	Mitigation Measures .....	115
5.11.4	Conclusion .....	116
5.12	Noise .....	116
5.12.1	Noise Sensitivity .....	116
5.12.2	Mitigation measures .....	117
5.12.3	Conclusion .....	117
5.13	Visual, Landscape and Flicker .....	117
5.13.1	Visual Impact Results .....	117
5.13.2	Anticipated issues as per the Visual Impact Assessment Report .....	119
5.13.3	Potential primary Impacts .....	119
5.13.4	Conclusion .....	120
5.14	Heritage .....	120



5.14.1	Desktop findings .....	120
5.14.2	Conclusion .....	122
5.15	Socio-Economic.....	122
5.15.1	Literature review .....	122
5.15.2	Potential Impacts .....	128
5.15.3	Conclusion .....	130
5.16	Traffic and Transportation.....	130
5.17	Electromagnetic and Radio Frequency Interference.....	131
5.18	Wake Impact Assessment .....	131
6	Impact Assessment .....	132
6.1	Methodology .....	132
6.2	Identification of Impacts .....	135
6.3	Potential Impacts of the Proposed Development.....	136
6.4	Mitigation measures.....	147
7	Plan of Study for undertaking the EIR .....	148
7.1	Alternatives considered .....	148
7.1.1	Location alternative .....	149
7.1.2	Layout alternative .....	149
7.1.3	Technology alternative .....	152
7.1.4	“No-Go” alternative.....	153
7.2	A description of the aspects to be assessed as part of the environmental impact assessment process .....	153
7.3	Aspects to be assessed by specialists.....	154
7.4	A description of the proposed method of assessing the environmental aspects .....	154
7.5	Particulars of the public participation process that will be conducted during the environmental impact assessment process	155
7.6	A description of the tasks that will be undertaken as part of the environmental impact assessment process .....	156
8	References .....	157
	Appendices .....	161

## APPENDICES

APPENDIX A: PRELIMINARY MAPPING	
APPENDIX B: PRELIMINARY LAYOUT DESIGN	
APPENDIX C: PUBLIC PARTICIPATION REPORT	
APPENDIX D: COMMENTS FROM STAKEHOLDERS	
APPENDIX E: PRELIMINARY SPECIALIST ASSESSMENTS	
APPENDIX F: SITE PHOTOGRAPHS	
APPENDIX G: SCREENING REPORT	
APPENDIX H: EAP CV AND QUALIFICATIONS	
APPENDIX I: UNDERTAKING UNDER OATH / EAP DECLARATION	

## LIST OF FIGURES

Figure 1-1: Locality map of the proposed Botterblom WEF.....	36
Figure 1-2: Farm portions of the study area and surrounding farms. ....	37
Figure 2-1: Simplified diagram of the main components of a horizontal axis wind turbine. Source: Albadi (2010). ....	42
Figure 2-2: Industrial Wind turbine components diagram. Source: The Renewable energy Hub. ....	42
Figure 2-3: Photographs depicting the construction phase of a wind farm similar to Botterblom WEF. ....	44
Figure 2-4: Example of an operational wind farm.....	45
Figure 3-1: Location of eight existing Renewable Energy Development Zones (REDZs) overlayed onto the electricity grid infrastructure corridors (Source: CSIR). The proposed project area is circled in red. ....	49
Figure 4-1: The S&EIR process in terms of the EIA Regulations (2014, as amended).....	66
Figure 5-1: The centre point and corner co-ordinates for the development site.....	72
Figure 5-2: Long Term Climate Graph (1950 - 2000) (Source: CapeFarmMapper ver 2.6; R.E. Schulze, 2009).....	73
Figure 5-3: Long Term Climate Graph (1950 - 2000) (Source: CapeFarmMapper ver 2.6; R.E. Schulze, 2009).....	73
Figure 5-4: Slope Percentage Class. (Source: Stellenbosch University, WCDOA, accessed from CapeFarmMapper ver 2.6). ....	74
Figure 5-5: Geological Classification of the proposed development footprint.....	75
Figure 5-6: Land use in the region of the study area.....	76

Figure 5-7: Abandoned farmstead on the study area.....	76
Figure 5-8: Screening Tool map of relative terrestrial biodiversity theme sensitivity. ....	77
Figure 5-9: Regional vegetation types in relation to the study area (SANBI, 2018). ....	79
Figure 5-10: The study area in relation to the Northern Cape Critical Biodiversity Areas (2016). ....	81
Figure 5-11: Freshwater Ecosystem Priority Areas.....	82
Figure 5-12: FEPA Rivers and wetlands.....	82
Figure 5-13: Habitats identified for the study area. ....	83
Figure 5-14: Preliminary Habitat sensitivity of the study area. ....	84
Figure 5-15: Screening Tool map of relative animal species theme sensitivity. ....	85
Figure 5-16: Screening Tool map of relative plant species theme sensitivity.....	85
Figure 5-17: Aloidendron dichotomum recorded within the study area. ....	87
Figure 5-18: Hoodia gordonii recorded within the study area.....	88
Figure 5-19: Avifauna SCC observed within the proposed Botterblom WEF PAOI.....	93
Figure 5-20: A photo showing Ludwig’s Bustards flying at rotor sweep height through the existing Khobab WEF.....	97
Figure 5-21: Active Martial Eagle nest on the southern portion of the study area.....	98
Figure 5-22: Bones and skulls of foraged species associated with the active Martial Eagle nest.....	98
Figure 5-23: Preliminary avifaunal sensitive features.....	101
Figure 5-24: Passive bat song meter locations showing the setup and immediate surrounding habitat. ....	104
Figure 5-25: Photographs of the railway road underpass and features relevant for potential bat roosts. ....	107
Figure 5-26: Photographs of the railway in-cut banks showing crevices relevant for potential bat roosts.....	107
Figure 5-27: Preliminary sensitive bat features within the study area showing the appropriate buffers. ....	109
Figure 5-28: Map indicating Normalised Difference Vegetation Index > 0.2 of the area. ....	110
Figure 5-29: Preliminary turbine positions in relation to potential watercourse sensitivities and 40m buffer.....	113
Figure 5-30: Agricultural Potential sensitivity (green = Low and yellow = Medium) as per the Screening Tool.....	115
Figure 5-31: Potential Noise Sensitive Areas and identified receptors.....	116
Figure 5-32: Representation of a wind turbine from a certain distance radius (1km, 2km, 5km and 10km) as per the Visual Impact Assessment Report.....	117
Figure 5-33: Known heritage sites in relation to the proposed layout.....	121

Figure 5-34: Farmstead and memorial located on site. ....	122
Figure 6-1: The Impact Mitigation Hierarchy (DEA et al., 2013).....	147
Figure 7-1: Wind resource map: average wind speed as measured at a height of 100m. The general area of the project is indicated by the black circle. ....	150
Figure 7-2: Preliminary layout design assessed during the scoping report. ....	151
Figure 7-3: Proposed updated layout design after the scoping report findings based on the combined sensitivity. This is but one suggested layout that will be assessed by the specialists for assessment during the EIA phase, as other alternatives are also being considered.....	152

**LIST OF TABLES**

Table 1-1: Enviro-Insight contact details .....	38
Table 1-2: EIA sub-consultant Project Team.....	39
Table 3-1: Environmental themes from Screening Tool which needs to adhere to in the Environmental Authorisation process. ....	47
Table 3-2: Listed activities triggered by the proposed Botterblom Wind Energy Facility.....	61
Table 5-1: Application Site of the Proposed Botterblom WEF Location. ....	72
Table 5-2: Attributes of the Bushmanland Basin Shrubland vegetation type. ....	78
Table 5-3: Expected and Observed list of Sensitive Plant Species for Botterblom WEF .....	86
Table 5-4: Priority avifauna species list (both expected and recorded as defined by Retief et al. 2012) for the study area.....	91
Table 5-5: Summary of avifauna species of conservation concern of known distribution, previously recorded in or adjacent to the study area pentads.....	94
Table 5-6: Summary of site visits and work conducted. ....	102
Table 5-7: The details of the deployed bat detectors. ....	103
Table 5-8: Species of bats that could potentially occur on the project area. ....	105
Table 5-9: Information in brief. Sources: 2011 Census, 2016 Community Survey. ....	123
Table 5-10: Crime stats for Local and District Municipality.....	125
Table 5-11: Potential Social Impacts as per the Social Impact Assessment Report. ....	129
Table 6-1: Status of Impacts. ....	133
Table 6-2: Spatial scale of Impacts. ....	133

Table 6-3: Temporal scale of Impacts .....	133
Table 6-4: Probability of Impacts.....	133
Table 6-5: Severity of Impacts.....	134
Table 6-6: Significance of Impacts. ....	134
Table 6-7: Perceived Significance of Impacts. ....	134
Table 6-8: Potential Impacts prior to mitigation measures. ....	136

## ABBREVIATIONS

<b>BESS</b>	Battery Energy Storage Systems
<b>BID</b>	Background Information Document
<b>CARA</b>	Conservation of Agricultural Resources Act
<b>CBA</b>	Critical Biodiversity Area
<b>DFFE</b>	Department of Forestry, Fisheries and the Environment
<b>DM</b>	District Municipality
<b>DMRE</b>	Department of Mineral Resources and Energy
<b>DWS</b>	Department of Water and Sanitation
<b>EA</b>	Environmental Authorisation
<b>EAP</b>	Environmental Assessment Practitioner
<b>EIA</b>	Environmental Impact Assessment
<b>EIR</b>	Environmental Impact Report
<b>EMFs</b>	Environmental Management Framework
<b>EMPr</b>	Environmental Management Programme
<b>ESA</b>	Ecological Support Area
<b>EWT</b>	Endangered Wildlife Trust
<b>FEPA</b>	Freshwater Ecosystem Priority Areas
<b>GIS</b>	Geographical Information System
<b>GNR</b>	Government Notice Regulation
<b>ha</b>	Hectare
<b>HIA</b>	Heritage Impact Assessment

<b>I&amp;APs</b>	Interested and Affected Parties
<b>IBA</b>	Important Bird and Biodiversity Area
<b>IDP</b>	Integrated Development Plan
<b>IEP</b>	Integrated Energy Plan
<b>IPP</b>	Independent Power Producer
<b>IRP</b>	Integrated Resource Plan
<b>IUCN</b>	International Union for Conservation of Nature
<b>kV</b>	Kilovolt
<b>LM</b>	Local Municipality
<b>Ltd</b>	Limited
<b>m/s</b>	Meters per second
<b>MAP</b>	Mean Annual Precipitation
<b>MAT</b>	Mean Annual Temperature
<b>MPRDA</b>	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 as amended)
<b>MW</b>	Megawatts
<b>NCDEANC</b>	Northern Cape Department of Environmental Affairs and Nature Conservation
<b>NDP</b>	National Development Plan
<b>NEM: AQA</b>	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
<b>NEM: BA</b>	National Environment Management: Biodiversity Act (Act 10 of 2004)
<b>NEM: PAA</b>	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
<b>NEM: WMA</b>	National Environmental Management: Waste Management Act (Act No. 59 of 2008)
<b>NEMA</b>	National Environmental Management Act (Act 107 of 1998) (as amended)
<b>NERSA</b>	National Energy Regulator of South Africa
<b>NFEPA</b>	National Freshwater Ecosystem Priority Areas
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
<b>NPAES</b>	National Protected Areas Expansion Strategy
<b>NRTA</b>	National Road Traffic Act
<b>NWA</b>	National Water Act

<b>PES</b>	Present Ecological State
<b>PICC</b>	Presidential Infrastructure Coordinating Committee
<b>PNCO</b>	Provincial Nature Conservation Ordinance
<b>PoS</b>	Plan of Study
<b>PPP</b>	Public Participation Process
<b>REDZs</b>	Renewable Energy Development Zones
<b>REIPPPP</b>	Renewable Energy Independent Power Producer Procurement Programme
<b>REPA</b>	Renewable Energy Purchasing Agency
<b>S&amp;EIR</b>	Scoping and Environmental Impact Reporting process contemplated in regulation 21 to regulation 24 of the EIA Regulations (2014, as amended)
<b>SAAO</b>	South African Astronomical Observatory
<b>SABAA</b>	South African Bat Assessment Association
<b>SABAP</b>	The Southern African Bird Atlas Project
<b>SACCA</b>	South African Civil Aviation Authority
<b>SACNASP</b>	South African Council for Natural Scientific Professions
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SANBI</b>	South African National Biodiversity Institute
<b>SANRAL</b>	South African National Roads Agency
<b>SARCA</b>	Southern African Reptile Conservation Assessment
<b>SARI</b>	South African Renewables Initiative
<b>SAWS</b>	South African Weather Services
<b>SDF</b>	Spatial Development Framework
<b>SDP</b>	Spatial Development Plan
<b>SIA</b>	Social Impact Assessment
<b>SIPs</b>	Strategic Integrated Projects
<b>SKA</b>	Square Kilometre Array
<b>SKEP</b>	Succulent Karoo Ecosystem Programme
<b>SCC</b>	Species of Conservation Concern

<b>WEF</b>	Wind Energy Facility
<b>WESSA</b>	Wildlife and Environmental Society of Southern Africa
<b>WRC</b>	Water Research Commission

## DEFINITIONS AND TERMINOLOGY

**Activity:** means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the NEMA as a listed activity or specified activity

**Alternatives:** in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

- (a) property on which or location where the activity is proposed to be undertaken;
- (b) type of activity to be undertaken;
- (c) design or layout of the activity;
- (d) technology to be used in the activity; or
- (e) operational aspects of the activity;

and includes the option of not implementing the activity;

**Application:** an application for an environmental authorisation in terms of Chapter 4 of the EIA Regulations (2014 as amended).

**Archaeology:** Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

**Avifauna Priority Species:** Threatened or rare birds (in particular those unique to the region and especially those which are possibly susceptible to wind-energy impacts), which occur in the given development area at relatively high densities or have high levels of activity in the area. These species should be the primary (but not the sole) focus of all subsequent monitoring and assessment.

**Bat acoustic monitoring:** Bat sampling conducted through recording and analysing echolocation call.

**Bat Roost:** This term has a dual application and is used to describe the structure (house, shed, bridge, tree, cave, etc.) within or on which a number of bats take shelter. Secondly, the bats within or on such a structure are also referred to as a roost of bats. 'Roost' does not infer a genetic or social association between the bats within a structure.

**Biodiversity:** Variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.

**Cumulative impact:** in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

**Cut-in speed:** The minimum wind speed at which the wind turbine will generate usable power.



**Cut-out speed:** The wind speed at which shut down occurs.

**Development:** the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

**Development footprint:** any evidence of physical alteration as a result of the undertaking of any activity.

**Environmental authorisation:** The Competent Authority's grant or denial of permission to undertake the proposed activity. Previously referred to as the Record of Decision (RoD).

**EAP:** an environmental assessment practitioner as defined in section 1 of the NEMA.

**EMPr:** an environmental management programme contemplated in regulation 23 of the EIA Regulations (2014 as amended).

**Environmental Impact Assessment:** a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.

**Indigenous vegetation:** refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

**Mitigation:** to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

**Mitigation Hierarchy:** a tool that guides users towards limiting as far as possible the negative impacts on the receiving environment from development projects. It emphasises best-practice of avoiding and minimising any negative impacts, and then restoring sites no longer used by a project, before finally considering offsetting residual impacts.

**Nacelle:** The body of a propeller-type wind turbine, containing the gearbox, generator, blade hub and other parts.

**No-Go areas:** refers to the option of not implementing the activity.

**One environmental system:** Agreement between the ministers of DFFE, DWS and DMRE to regulate all environmental related aspects and give effect to fixed and synchronised timeframes for the consideration and issuing of the decisions.

**Palaeontology:** Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

**Plan of study:** a study contemplated in regulation 22 of the EIA Regulations (2014 as amended) which forms part of a scoping report and sets out how an environmental impact assessment will be conducted.

**Population:** the number of individuals of a given species occupying a certain area of land over a certain period of time.

**Pre-construction monitoring and impact assessment (avifauna and bat specific):** a full assessment of the significance of likely impacts and available mitigation options, based on the results of systematic and quantified monitoring.

**Registered interested and affected party:** in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the EIA Regulations (2014 as amended).

**Renewable energy:** Energy that comes from sources that are continually replenished, such as sunlight, wind, rain, tides, waves, and geothermal heat.

**Rotor:** The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of about 15 to 28 revolutions per minute (rpm).

**Rotor-swept area:** The area of the circle or volume of the sphere swept by the turbine blades.

**Scoping Report:** a report contemplated in regulation 21 of the EIA Regulations (2014 as amended).

**Significant Impact:** an impact that may have a notable effect on one or more aspects of the environment or may result in noncompliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

**Specialist:** a person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies. A specialist needs to be professionally registered (e.g. with the South African Council for Natural Scientific Professions).

**Tower:** The tower supports the rotor, and is constructed from tubular steel and/or concrete. The nacelle and the rotor are attached to the top of the tower. The tower raises the wind turbine so that its blades safely clear the ground in order to reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

**Watercourse:** Definition adapted from the National Water Act, 1996 (No. 36 of 1998):

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water, such a natural pans and farm dams.

**Wind energy facility:** A group of wind turbines often owned and maintained by one company, also known as a wind power plant or wind farm.

**Wind rose:** The diagrammatic representation of joint wind speed and direction distribution at a particular location. The length of time that the wind comes from a particular sector is shown by the length of the spoke, and the speed is shown by the thickness of the spoke.

**Wind turbine:** A device that converts kinetic energy from the wind, also called wind energy, into electrical energy in a process known as wind power.

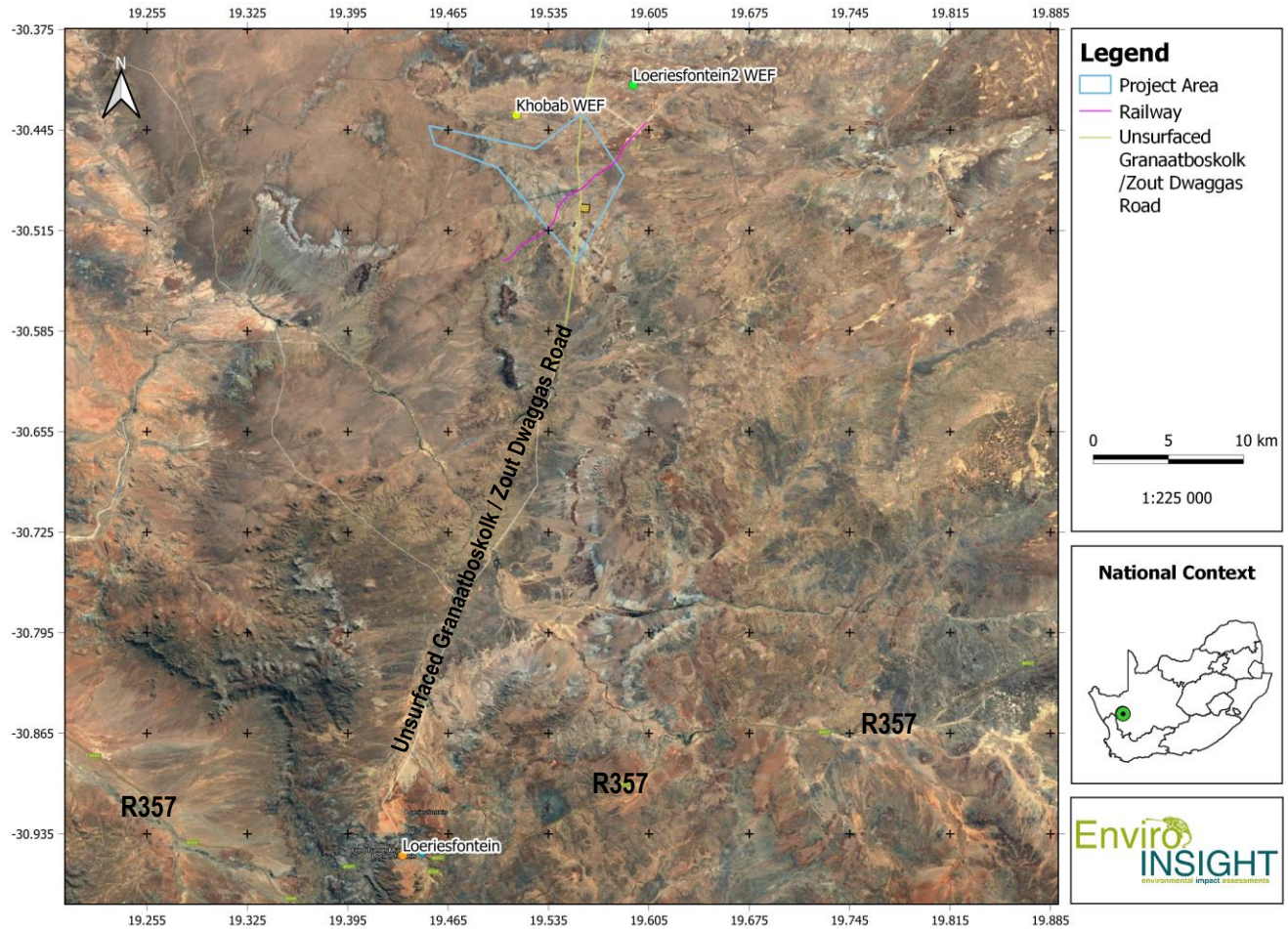
## 1 INTRODUCTION

FE Botterblom (Pty) Ltd (hereafter the Applicant) is proposing the development of a wind energy facility (WEF) and associated infrastructure on a site located approximately 53 kilometers (km) north of Loeriesfontein in the Northern Cape province of South Africa. The proposed development, to be known as Botterblom WEF, will have a generation capacity of up to 240MW which will feed into the National Grid. Enviro-Insight CC (hereafter Enviro-Insight) has been appointed to undertake the requisite environmental impact assessment (EIA) process for the WEF as required in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, on behalf of the Applicant.

The proposed study area for the WEF development is located approximately 53km north of Loeriesfontein, 85 km west of Brandvlei and 160 km southeast of Springbok in the Northern Cape. The site can be reached via unsurfaced Granaatboskolk / Zout Dwaggas Road, which branches off the R357 (Figure 1-1). The Botterblom WEF footprint is approximately 5 736 hectares (ha) and will be located on a Portion of the Remainder of the Farm Sous 226 (21-digit Surveyor General code: C0150000000022600000) (Figure 1-2). The Khobab WEF is located directly north while Loeriesfontein2 WEF is located north-east of the study area.

The Botterblom WEF will consist of up to 35 wind turbines, with a generation capacity of between 4.5 and 7.5 MW per turbine, depending on the available technology at the time. Each turbine will have a hub height of up to 150m and a rotor diameter of up to 175m. The final turbine model to be utilised will only be determined closer to the time of construction, depending on the technology available at the time. Additional ancillary infrastructure to the WEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), foundations to support turbine towers, internal/ access roads (up to 10 m in width) linking the wind turbines and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) with the relevant stormwater infrastructure and gates constructed as required. The perimeter of the proposed WEF may be enclosed with suitable fencing. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin will also be established.

Additionally, a power line with a capacity of up to 132kV is required. At this stage, options are still being considered for either the construction of a new line to feed into the Helios substation, or connect with existing lines. This associated electrical infrastructure will require a separate Environmental Authorisation and will be conducted as a part of a separate Basic Assessment (BA) process. More details will be provided in the Final Environmental Impact Assessment Report (FEIAR).



**Figure 1-1: Locality map of the proposed Botterblom WEF.**

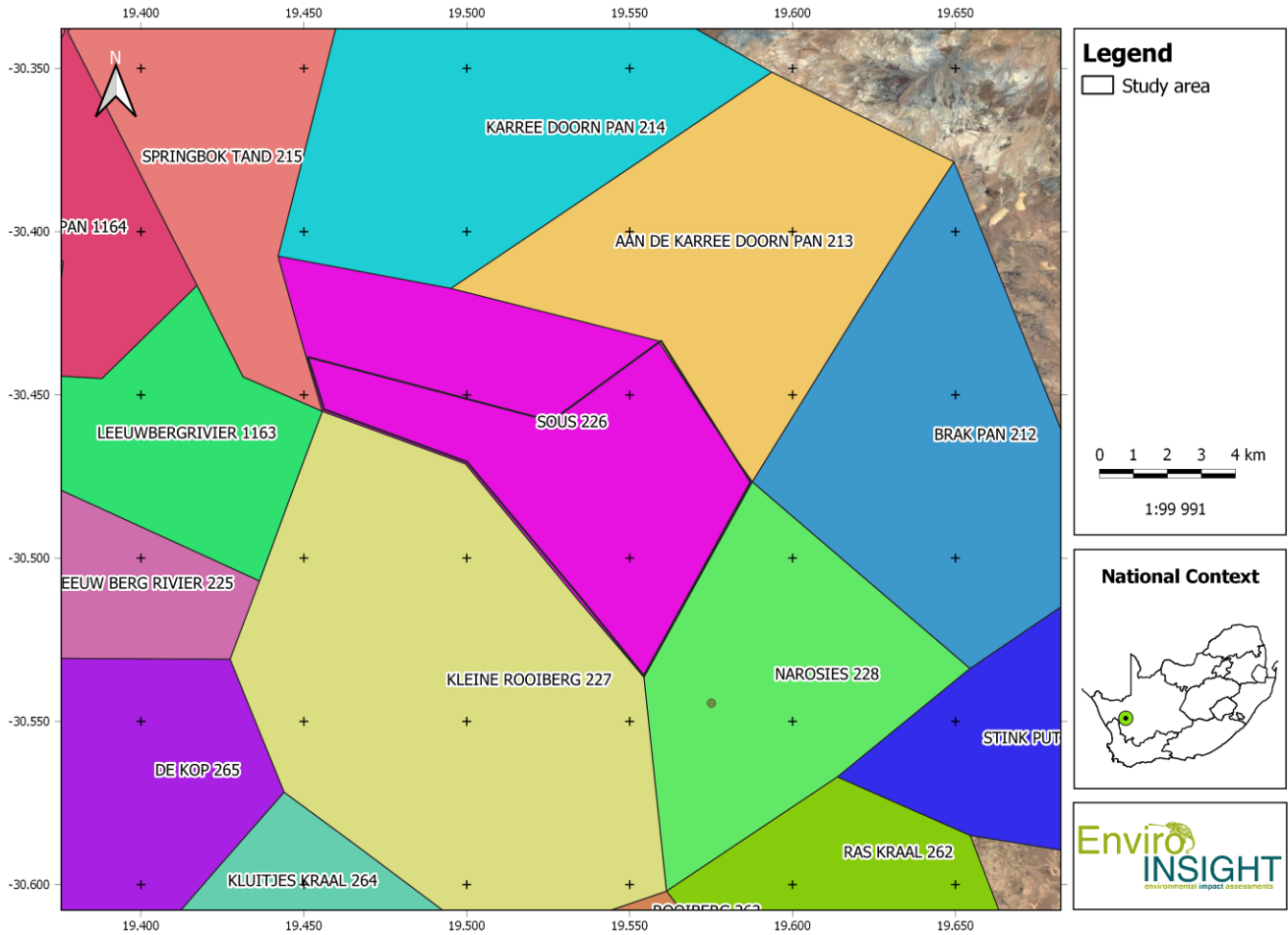


Figure 1-2: Farm portions of the study area and surrounding farms.

### 1.1 APPLICANT DETAILS

<b>Applicant</b>	FE BOTTERBLOM PTY LTD
<b>Contact Person</b>	Ralf Grass
<b>Address</b>	60 Hennie Winterbach Street Panorama Western Cape 7500
<b>Telephone</b>	+27 21 013 3614
<b>Email</b>	<a href="mailto:ralf.grass@energyteam.co.za">ralf.grass@energyteam.co.za</a> / <a href="mailto:millard.kotze@genesis-eco.com">millard.kotze@genesis-eco.com</a>

## 1.2 THE ENVIRONMENTAL IMPACT ASSESSMENT PROJECT TEAM

### 1.2.1 Environmental Assessment Practitioner (EAP)

FE Botterblom (Pty) Ltd has appointed Enviro-Insight CC as an independent Environmental Assessment Practitioner (EAP) to undertake a Scoping and Environmental Impact Assessment (S&EIA) process for the proposed Botterblom WEF. Enviro-Insight CC has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations (2014, as amended). For purposes of this S&EIA, the following person may be contacted at Enviro-Insight CC:

*Table 1-1: Enviro-Insight contact details*

<b>Company</b>	Enviro-Insight CC
<b>Contact Person</b>	Corné Niemandt
<b>Purpose</b>	Project consultant and EAP
<b>Address:</b>	Unit 8 Oppidraai Office Park, 862 Wapadrand Road, Wapadrand Security Village, Pretoria, 0081
<b>Telephone:</b>	012 807 0637
<b>Email:</b>	<a href="mailto:corne@enviro-insight.co.za">corne@enviro-insight.co.za</a>

#### 1.2.1.1 Qualifications and Memberships

Mr. Niemandt holds a *M.Sc.* degree in Plant Science from the University of Pretoria (2015) and is registered as a professional scientist (*Pr.Sci.Nat.*) with the South African Council for Natural Scientific Professions (SACNASP) and is a member of the International Association for Impact Assessment South Africa (IAIASa).

#### 1.2.1.2 Summary of past experience

Mr. Niemandt has over five years' experience as an environmental consultant, compiling and managing several environmental authorisation reports, including Environmental Management Programmes (EMPr), rehabilitation plans and environmental auditing. This included fieldwork, data collection, preparation of permits and licensing studies, compliance monitoring and community engagement, and project managing interdisciplinary teams and contractors. In addition, he has also compiled over 45 terrestrial biodiversity reports in South Africa. Mr. Niemandt has operated in several African countries, including South Africa, Mozambique, Tanzania and Liberia. Refer to Appendix H for the signed declaration of interest of the EAP.

### 1.2.2 Specialists

Specialist studies are being undertaken to address the key issues that require further investigation based on the screening report generated (Appendix G). The specialist studies involve the gathering of data relevant to identifying and assessing impacts that may occur as a result of the proposed project. The specialists will also recommend appropriate mitigation or optimisation measures to minimise potential negative impacts or enhance potential benefits, respectively.

Enviro-Insight has selected a team of highly experienced specialists in order to execute this S&EIA in a professional and impartial manner. The project team, specifically the sub-consultants, is indicated in

**Table 1-2: EIA sub-consultant Project Team.**

Specialist Assessment	Company	Professional Specialist
Terrestrial Biodiversity	Enviro-Insight CC	Luke Verburgt <i>Pr.Sci.Nat.</i> Samuel Laurence <i>Pr.Sci.Nat.</i> Alex Rebelo <i>Cand.Sci.Nat.</i>
Sensitive Plant Species	Enviro-Insight CC	Corné Niemandt <i>Pr.Sci.Nat.</i> Alex Rebelo <i>Cand.Sci.Nat.</i>
Avifauna	Enviro-Insight CC	Samuel Laurence <i>Pr.Sci.Nat.</i> Luke Verburgt <i>Pr.Sci.Nat.</i>
Bats	Enviro-Insight CC	Dr Low de Vries <i>Pr.Sci.Nat.</i> Samuel Laurence <i>Pr.Sci.Nat.</i>
Aquatic Biodiversity	WaterMakers	Willem Lubbe <i>Pr.Sci.Nat.</i>
Socio-economic	Independent social sciences consultant	Stephen Horak
Noise	Enviro Acoustic Resources (EAR)	Morné de Jager
Traffic	Innovative Transport Solutions Global	Pieter Arangie
Visual and Flicker	LOGIS	Lourens du Plessis
Heritage and Paleontological	HCAC	Jaco van der Walt
Agriculture Compliance Statement	Independent Consultant	Johann Lanz

In addition to the S&EIA process, Enviro-Insight has provided a Terrestrial Biodiversity team that has conducted the avifauna, bats, sensitive plant species and terrestrial biodiversity assessments for this project. Accordingly, an independent specialist for each of these assessments will be appointed for the final review of the EIA reports in order to ensure that all reports are independent and unbiased.

Neither Enviro-Insight nor any of its sub-consultants are subsidiaries of *FE Botterblom*, nor is *FE Botterblom* a subsidiary to Enviro-Insight. Enviro-Insight, its sub-consulting specialists, and external reviewers, do not have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project.

### 1.3 ASSUMPTIONS AND LIMITATIONS

Certain assumptions, limitations, and uncertainties are associated with the Scoping Phase. This report is based on information that is currently available and, as a result, the following limitations and assumptions are applicable:

- This report is based on project information provided by the Applicant, the initial layout design and the generated screening report dated February 2021;
- This report is based on a project description taken from client meetings, preliminary drawings and design specifications for the proposed WEF that have not yet been finalised and which are likely to undergo a number of iterations and refinements before they can be regarded as definitive and proposed methodology for the operations. Detailed information will be provided in the EIA Phase;
- Initial specialist studies have been completed for the scoping phase. Descriptions of the environmental, economic and social environments are based on limited desktop assessments and available literature for the area. Where necessary, specialists have been consulted. More detailed information will be provided in the EIA phase based on the outcomes of the specialist studies. Limited scoping-phase specialist input was obtained for inclusion in this report;

- The description of the baseline environment and where possible the up-to-date information has been obtained from various sources. More detailed information will be provided in the EIA phase based on the outcomes of the specialist studies, and the finalisation of the design layout;
- A detailed impact assessment cannot be done at present as the levels of confidence are considered low until detailed specialist input and comments from the I&APs are obtained which will be presented and discussed in more detail during the EIA phase;
- Public Participation is a ongoing process and will continue throughout the EIA process. I&APs can register at any time and contact the EAP regarding comments, issues or concerns throughout the process. I&APs should not wait until an opportunity arises such as when the draft reports are released for review and comment to raise their concerns or interact with the EAP.

## 1.4 STRUCTURE OF THE SCOPING REPORT

This Scoping Report consists of the following sections:

- Chapter 1: Introduces the Botterblom WEF project, the project team and a general description of the scoping phase.
- Chapter 2: Description of the proposed project, including the need and desirability.
- Chapter 3: Legal context relevant to the project.
- Chapter 4: Scoping and EIR Process approach and methodology which includes the public participation process
- Chapter 5: Description of the receiving environment
- Chapter 6: Impact Assessment
- Chapter 7: A plan of study for undertaking the environmental impact assessment process to be undertaken
- Chapter 8: References

## 2 DESCRIPTION OF THE PROPOSED PROJECT

### 2.1 NATURE AND EXTENT OF PROPOSED BOTTERBLOM WEF

The Applicant is responding to the growing electricity demand within South Africa, the current infrastructure failure which disrupts sufficient electricity supply, and the increasing pressure on countries to reduce their reliance on fossil fuels, by addressing the need for sustainable renewable energy in the country. Accordingly, the Applicant is proposing the development of a commercial WEF and associated infrastructure on the remainder of the farm Sous 226, located north of Loeriesfontein, to add new capacity to the national electricity grid.

The proposed study area for the WEF development is located approximately 53km north of Loeriesfontein, 85 km west of Brandvlei and 160 km southeast of Springbok in the Northern Cape. The site can be reached via unsurfaced Granaatboskolk / Zout Dwaggas Road, which branches off the R357 (Figure 1-1). The Botterblom WEF footprint is approximately 5 736 hectares (ha) and will be located on a Portion of the Remainder of the Farm Sous 226 (Figure 1-2). The Khobab WEF is located directly north while Loeriesfontein2 WEF is located north-east of the study area.



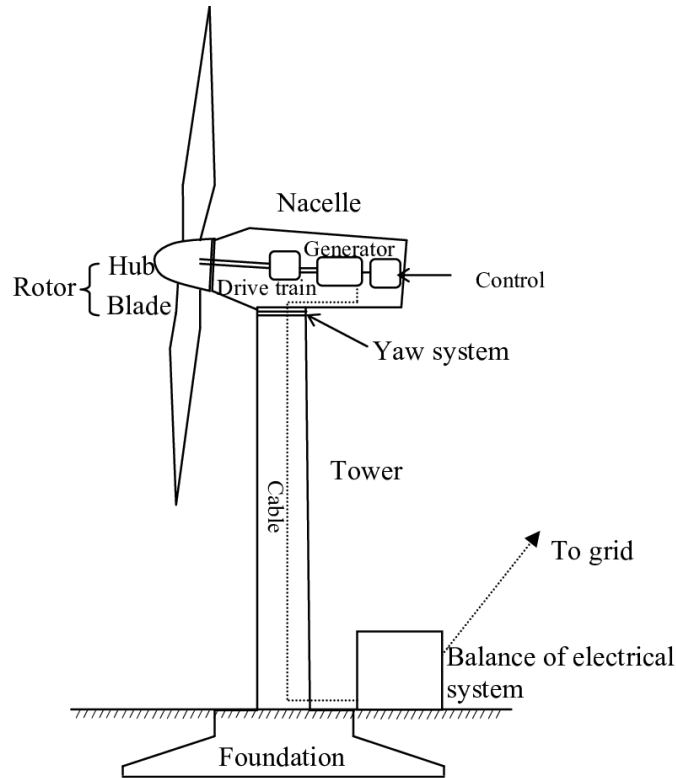
The proposed Botterblom WEF will consist of up to 35 wind turbines, with a generation capacity of between 4.5 and 7.5 MW per turbine, depending on the available technology at the time. Each turbine will have a hub height of up to 150m and a rotor diameter of up to 175m. The final turbine model to be utilised will only be determined closer to the time of construction, depending on the technology available at the time. The optimal positioning (taking into account the energy generating potential) for each turbine will be determined once all the environmental sensitivities have been determined in the EIA phase. The final layout design and development footprint will be included in the EIA report.

The components of the WEF and associated infrastructure are as follows:

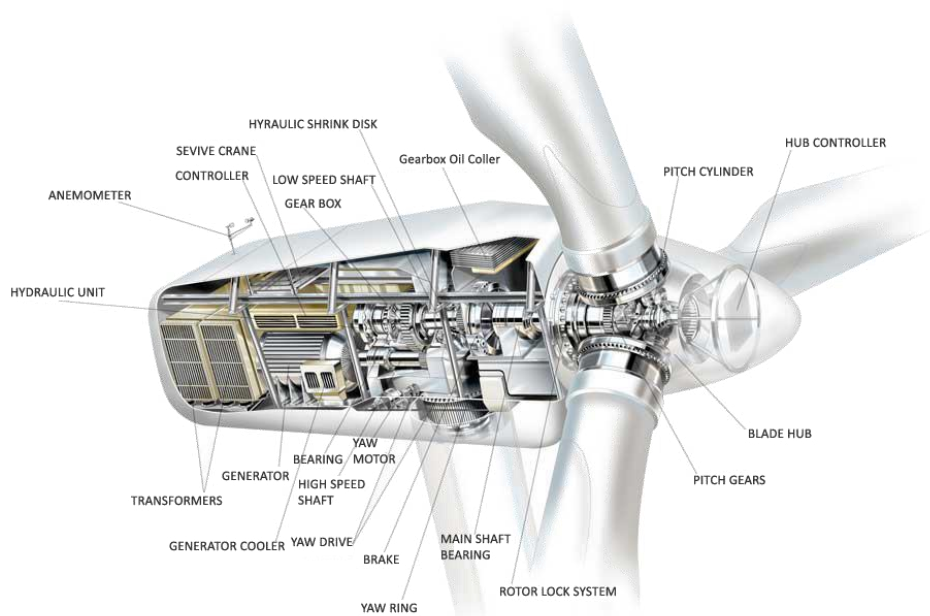
- up to 35 wind turbines, with a generation capacity of between 4.5 and 7.5 MW per turbine (depending on the available technology at the time),
- turbines will have a hub height of up to 150m and a rotor diameter of up to 175m. The final turbine model to be utilised will only be determined closer to the time of construction (depending on the technology available at the time),
- onsite substation/s of 100mX100m (33/132kV) to facilitate the connection between the WEF and Helios substation,
- a Battery Energy Storage System (BESS),
- concrete foundations to support turbine towers,
- cabling between turbines, to be laid underground where practical,
- internal/ access roads (up to 10 m in width) linking the wind turbines and other infrastructure on the site,
- permanent workshop area and office for control, maintenance and storage, and
- temporary laydown areas during the construction phase (which will be rehabilitated).

The components of a typical wind turbine subsystem are depicted by Figure 2-1 and Figure 2-2, which entails:

- **Rotor (consisting of hub and blades)**, which are the portion of the wind turbine that collect energy from the wind and convert the wind's energy into rotational shaft energy to turn the generator. The speed of rotation of the blades is controlled by the nacelle, which has the ability to turn the blades to face into the wind and change the angle of the blades to make the most use of the available wind. The maximum rotor diameter for the Albany WEF turbines is approximately 175 m, with blade lengths of 87.5m.
- **Nacelle** – The nacelle contains a set of gears and a generator. The generator converts the turning motion of a wind turbines blade (mechanical energy) into electricity. The nacelle is also fitted with brakes, so that the turbine can be switched off during very high winds, such as during storm events, which prevents the turbine from being damaged
- **Tower** – The rotor and nacelle are mounted on top of a tower. The tower (either steel or concrete) is constructed to hold the rotor blades off the ground (structural support) and also raises the hub so that its blades safely clear the ground and can reach the stronger winds at higher elevations. The tower must also be strong enough to support the wind turbine and to sustain vibration, wind loading, and the overall weather elements for the lifetime of the turbine. The maximum hub height of the Botterblom WEF turbines is approximately 150m.
- Electronic equipment such as controls, electrical cables, ground support equipment, and interconnection equipment.



**Figure 2-1: Simplified diagram of the main components of a horizontal axis wind turbine. Source: Albadi (2010).**



**Figure 2-2: Industrial Wind turbine components diagram. Source: The Renewable energy Hub<sup>2</sup>.**

<sup>2</sup> <https://www.renewableenergyhub.co.uk/main/wind-turbines/how-does-a-wind-turbine-work/>

## 2.2 PROJECT DEVELOPMENT PHASES

The following section describes the details the different phases of the proposed Botterblom WEF:

- Pre-construction;
- Construction;
- Operation; and
- Decommission.

### Pre-construction

Prior to the commencement of the main construction works, the Contractor will undertake vegetation clearance and site establishment works.

This phase ensures that all design layouts are finalised, that risks associated with the construction phase is discussed and mitigated prior to commencement, to do a final walkdown of the study area and to apply and secure the necessary permits. The 'search and rescue' procedure with regards to plants, animals and heritage features must be done, and all sensitive areas with their buffers must be demarcated prior to commencement with construction activities.

### Construction

The construction phase is temporary in nature (usually between 12-18 months) with a development footprint for the construction of:

- compounds and laydown areas;
- platforms, or "crane pads", required to construct the wind turbines;
- establishment and laying of foundations for turbines;
- new or upgraded access and internal roads (some roads may be temporary during the construction phase);
- storage areas and site office;
- substation and BESS;
- underground cables to connect the turbines to the on-site substation;

Even though not a physical construction activity, the construction phase includes the transport of components and equipment to and within the site.

After the construction phase is completed, rehabilitation of temporary construction areas will commence. Any area that does not form part of the operational phase of the project (this can include internal roads and access points) must be rehabilitated as per the rehabilitation plan (to be included in the EIA report).

### Operational phase

The operational phase of the WEF has an approximate lifespan of 20 years, and mainly consists of operation and maintenance. All the turbines will be operational except under circumstances of mechanical breakdown, inclement weather conditions or for maintenance purposes.

## Decommissioning

Wind farm components have an expected end of life, whereby the components need to be dismantled and transported off site, or by replacing the existing infrastructure with the latest technology based on the relevant legislation at the time. Decommissioning requires a temporary laydown area and associated access to accommodate the required equipment and lifting cranes. Prior to the transportation off site, the components need to be evaluated based on reuse, recycle or permanent disposal in accordance with regulatory requirements at that time. The area needs to be rehabilitated based on the rehabilitation plan, by returning the soil, landscape features and vegetation back to its original state prior to the construction phase in order for the land to be used for agricultural purposes again, or as determined by the landowner and competent authorities.



*Figure 2-3: Photographs depicting the construction phase of a wind farm similar to Botterblom WEF.*



*Figure 2-4: Example of an operational wind farm.*

## 2.3 NEED AND DESIRABILITY

As part of the EIA process, the need and desirability for the development of the proposed Botterblom WEF needs to be considered and discussed in order to provide context regarding the realistic economic and social benefits the development will add on all spheres of government (local, provincial and national).

Reference is made to the Department of Environmental Affairs (DEA) 2017 Guideline on Need and Desirability which states that while the “concept of need and desirability relates to the type of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which need refers to time and desirability to place – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to wise use of land – i.e., the question of what is the most sustainable use of land.”

### 2.3.1 National Perspective

The need for renewable energy is becoming increasingly apparent, in both local and international context, with South Africa becoming an integral part of the global transition towards renewable sources of electricity generation. The urgency behind this advancement can be appreciated considering that South Africa is the largest emitter of greenhouse gases in Africa, and is also estimated to rank amongst the top 20 largest emitters of greenhouse gases in the world, mainly due to the burning of fossil fuels. Investment in renewable energy is continuing to increase as countries transition their power systems to cleaner sources of energy. New investment in fossil fuel (coal) fired power plants is in decline with local and international financial institutions including development financial institutions announcing a stop on financing coal or financing aligned to the OECD position to only finance high efficiency low emissions plants of specific sizes. The South African government is therefore committed to supplementing the existing generation capacity of thermal and nuclear power plants with renewable energy power generation, thus creating the framework that will lead to an increase to reduce its overall environmental footprint from power generation (including externality costs), and thereby to steer the country on a pathway towards sustainability.

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 Department of Energy's Integrated Resource Plan, 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 use of renewable energy technologies, as one 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 greenhouse gas emissions when it displaces fossil-fuel derived from electricity. In this light, renewable wind energy can be seen as desirable.

Onshore wind energy technology is the most commonly used and commercially developed renewable energy technology in South Africa (DEA Guideline for Renewable Energy, 2015). Wind power generates electricity without releasing toxic pollution or CO<sub>2</sub> emissions and is abundant and inexhaustible. Wind energy is also one of the lowest-priced renewable energy sources and is economically competitive.

The need for the proposed development is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. National, provincial and local policies and planning documents support the development of renewable energy facilities, and the associated socioeconomic boost at the local level in an area that is in need of it.

### 2.3.2 Provincial and Local context

The Northern Cape Province, Namakwa District Municipality (NDM) and Hantam Local Municipality (HLM) support renewable energy projects. In the NDM Spatial Development Framework (SDF), a number of major infrastructure projects are identified and supported, including "the promotion of domestic and large scale solar energy usage and projects such as wind and solar farms subject to appropriate guidelines and siting principles". The SDF specifically lists wind and solar farm siting principles based on slope, geology, soils, surface hydrology, ground water and vegetation. The HLM Integrated Development Plan (2020/2021) specifically includes the importance of renewable energy projects for the region as part of *Objective 1: Exploit economic opportunities*, as it creates jobs directly while supporting local businesses in the area (such as accommodation, restaurants, shops, fuel etc.). Business plans have been drafted to attract investors to develop more renewable energy projects, especially within the Loeriesfontein vicinity.

The Developer, or wind farm, can also positively contribute to specified programmes in the IDP to build economic and social infrastructure. This will further assist the HLM to speedup economic growth, transforming the economy and develop and maintain new infrastructure.

The Loeriesfontein ward region (Ward 5) is a very arid region of the Northern Cape where agricultural potential is very low, and the land has little potential for other types of use. Sheep farming forms the predominant land use and large expanses of land are required for grazing. Large farms (exemplified by those on which this project is proposed) hold little to no economic opportunity for the farmers with little access to water. In general, many of the farmers are unable to employ permanent farm workers, and generally only employ seasonal workers for activities such as sheep shearing. Even though the land is zoned as Agricultural land, the respective landowners sign an option for a long-term lease agreement with Developers, where grazing can continue below the turbines and thereby not sterilising the economic viability of the farm. A change in land use might be required and will be submitted to the local municipality for approval.

### 3 LEGAL CONTEXT

In terms of GNR 779 of 1 July 2016, the National Department of Environment, Forestry and Fisheries (DEFF) has been determined as the Competent Authority for all projects which relate to the Integrated Resource Plan (IRP) for electricity (2010-2030), and any updates thereto.

The legislative and policy context of the Report is described in detail below.

#### 3.1 NATIONAL ENVIRONMENTAL SCREENING TOOL AND ENVIRONMENTAL THEME PROTOCOLS

##### 3.1.1 Screening Report

The Minister of Environment, Forestry and Fisheries, gave notice that the submission of a report generated from the national web-based environmental screening tool<sup>3</sup>, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.

In addition, a set of protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process were developed and on 20 March 2020 the Minister of Forestry, Fisheries and the Environment gazetted the Protocols for national implementation purposes. The gazette ‘Procedures to be followed for the Assessment and Minimum Criteria for Reporting of Identified Environmental Themes in terms of Section 24(5)(a) and (h) of the National Environmental Management Act (1998) when Applying for Environmental Authorisation’, has protocols that have been developed for environmental themes which include agriculture, avifauna, biodiversity (Terrestrial and Aquatic Biodiversity), noise, defence and civil aviation.

The protocols set requirements for the assessment and reporting of environmental impacts of activities requiring EA. The higher the sensitivity rating of the features on the proposed site as identified by the screening tool report, the more rigorous the assessment and reporting requirements.

Based on the generated screening report, all environmental theme sensitivities are indicated in Table 3-1 below.

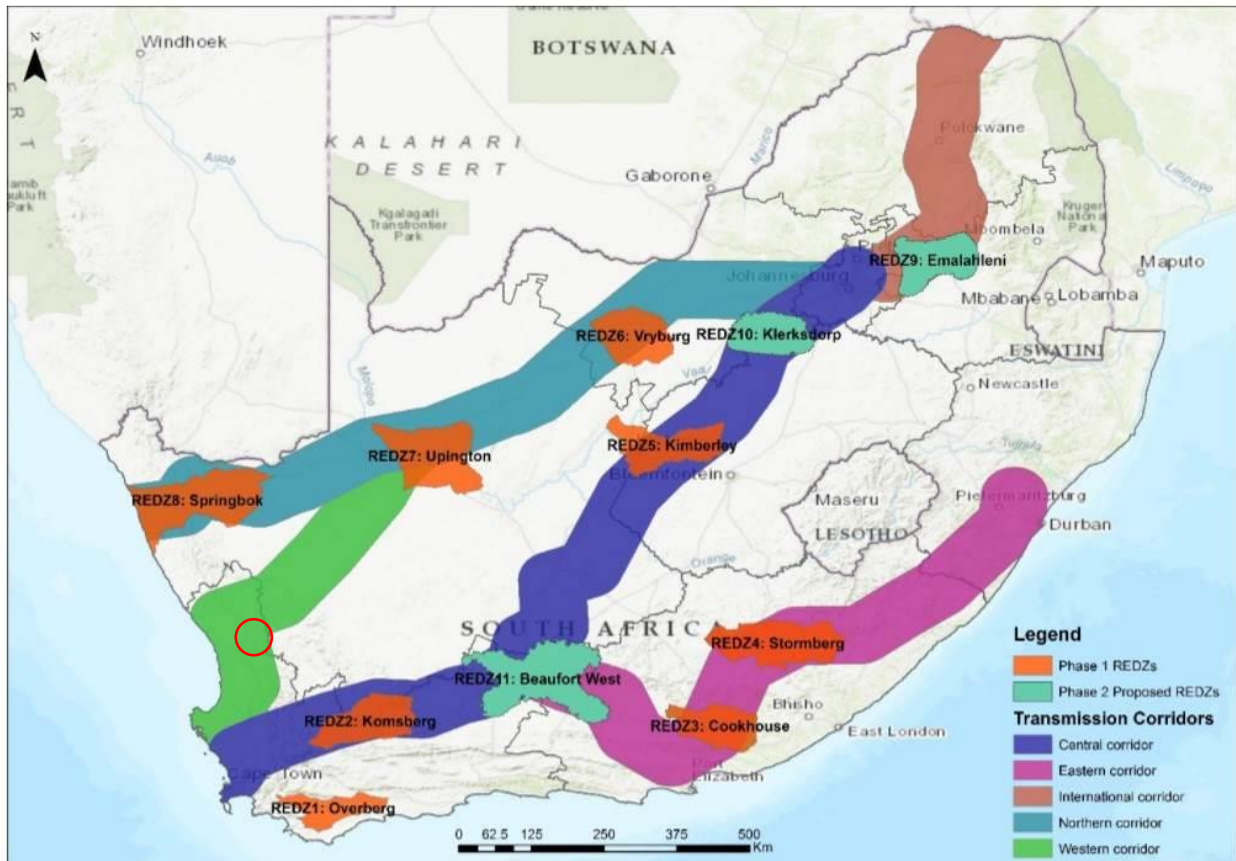
**Table 3-1: Environmental themes from Screening Tool which needs to adhere to in the Environmental Authorisation process.**

Theme	Very High sensitivity*	High sensitivity*	Medium sensitivity	Low sensitivity
Agriculture Theme				
Animal Species Theme				
Aquatic Biodiversity Theme				
Archaeological and Cultural Heritage Theme				
Avian (Wind) Theme				
Bats (Wind) Theme				
Civil Aviation (Wind) Theme				

<sup>3</sup> <https://screening.environment.gov.za/screeningtool/#/pages/welcome>







**Figure 3-1: Location of eight existing Renewable Energy Development Zones (REDZs) overlaid onto the electricity grid infrastructure corridors (Source: CSIR). The proposed project area is circled in red.**

### 3.3 RENEWABLE ENERGY AUTHORISATION REQUIREMENTS

The legislative and policy context of this Report is detailed below. The planning context is detailed in Section 3.3 hereafter as part of the ‘need and desirability’ evaluation.

#### Constitution of the Republic of South Africa, Act 108 of 1996

The Constitution of the Republic of South Africa is the supreme law of the country and underpins all environmental legislation. As such, any law or conduct that is inconsistent with the Constitution is invalid (Constitution, 1996). The Constitutional environmental right is included in section 24, which states:

“Everyone has the right—

- (a) to an environment that is not harmful to their health or well-being; and
- (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—
  - (i) prevent pollution and ecological degradation;
  - (ii) promote conservation; and

- (iii) *secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.*

The constitution also gives provision in section 27(1)(b) which states that everyone has the right to have access to sufficient water and section 27(2) requires the state to take reasonable and other measures, within its available resources, to achieve the progressive realization of each of these rights.

The Constitution of the Republic of South Africa forms the foundation of all environmental principles and management in the country and it is enshrined in all legislation. Such legislation is discussed below with specific reference to the environment.

### **Aspect of Project**

An EIA process is being undertaken to determine the impacts associated with the project, including environmental, social and economic. As part of the EIA process, mitigation measures and monitoring plans are compiled to ensure that any potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution. The project must prove to be sustainable and balance the social, economic and environmental aspects of sustainable development.

### **National Environmental Management Act (Act 107 of 1998 as amended) and EIA Regulations (2014, as amended)**

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended) gives effect to the Constitution of the Republic of South Africa by providing a framework for cooperative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment.

Chapter one of the NEMA outlines national environmental management principles that must be incorporated into all decisions regarding the environment, throughout the country by all organs of state. Central to these principles is the concept of sustainability, which entails meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.

Chapters two to three of the NEMA outline government and non-government institutions and their responsibilities for ensuring co-operative governance and making decisions.

Chapter 5 of NEMA provides for integrated environmental management. The purpose of this Chapter is to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities. Section 24 (1) specifically states:

*“In order to give effect to the general objectives of integrated environmental management laid down in this Chapter. the potential impact on—*

- (a) the environment;*
- (b) socio-economic conditions; and*
- (c) the cultural heritage,*

*of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.”*

NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of a listed activity in terms of the Environmental Impact Assessment Regulations Listing Notices for Basic Assessment or scoping & Environmental Impact Assessment (S&EIA).

In South Africa, EIA became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant environmental authorisation. On 21 April 2006 the Minister of Environmental Affairs and Tourism promulgated the first EIA regulations in terms of Section 24 of NEMA. These EIA regulations, under sections 24(5) and 44 of NEMA, were updated in June 2010 and again in December 2014. In April 2017, the 2014 EIA regulations were amended.

Environmental authorisation for an activity may only be issued by the competent authority (CA) after the developer has complied with the procedural requirements as set out in the 2014 EIA regulations of NEMA.

### **Aspect of Project**

The NEMA EIA regulations, 2014 (as amended) are applicable to this project. Several listed activities in terms of NEMA GNR No. R982, R983, R984 and R985 in the Government Gazette of 4 December 2014, as amended, have been triggered and need to be authorised for the proposed wind farm.

Based on the listed activities triggered, the application for environmental authorisation will follow the Scoping and EIR process as set out in Regulations 21-24.

### **National Environmental Management: Biodiversity Act (Act 10 of 2004 as amended)**

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 as amended) ("NEMBA") aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources. The Act places severe restrictions on activities that could have adverse effects on threatened or protected species.

The purpose of the NEMBA includes:

- the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998;
- the protection of species and ecosystems that warrant national protection; and
- the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources.

Provision is made for protection of threatened or protected ecosystems and species as well as provisions guarding against the introduction of alien and invasive species. The Act identifies restricted activities involving listed threatened, protected or alien species. These activities include picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species. As stipulated in Section 57 of the Act, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7. Lists of critically

endangered, endangered, vulnerable and protected species in GNR 151 of 23 February 2007 and List of threatened ecosystem 2011 have been published under NEMBA. Regulations have also been promulgated on Threatened and Protected Species in GNR 324 (29 April 2014). These lists and associated restricted activities as well as the regulations need to be taken into account during the implementation of any renewable energy development activities as well as during assessments for authorisations associated with these activities in terms of other legislation.

Application may be made for a permit to engage in restricted activities, which application may be subject to various stringent requirements as set out in Section 88 of the NEMBA. The CA responsible for administrating the NEMBA is dependent on the province in which the activity is taking place.

### **Aspect of Project**

**Protected species:** Several threatened species occur or are likely to occur on the study area, including. As the Terrestrial Biodiversity Assessment is ongoing, detailed information will be presented in the EIR.

**Threatened Ecosystems:** No listed threatened ecosystems intersect the Project Areas.

**Alien and Invasive Species:** All alien species need to be controlled and management interventions indicated in the Environmental Management Programme. Species such as *Prosopis glandulosa* (Category 3 invader) has been recorded on site.

### **Environmental Conservation Act, Act No. 73 of 1989 (ECA)**

In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCR) was promulgated. The NCRs were revised under Government Notice Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Currently, no provincial or local regulations exist in the Northern Cape and no approval is required.

WEFs and related infrastructure will increase noise levels during operation as well as possible construction noises. Noise emitted by WEFs include aerodynamic sources due to the passage of air over the wind turbine blades and mechanical sources which are associated with components of the powertrain within the turbine, such as the gearbox and generator and control equipment for yaw, blade pitch, etc.

### **Aspect of Project**

A Noise Impact Assessment will be included in the EIR.

### **National Environmental Management: Air Quality Act (Act 39 of 2004 as amended)**

The National Environment Management: Air Quality Act (NEMAQA) serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965) and various other laws dealing with air pollution.

According to the Act, the national environmental Department (DFFE), the provincial environmental departments and local authorities are separately and jointly responsible for the implementation and enforcement of various aspects of the Air Quality Act.

### ***Aspect of Project***

Although no major air quality issues are expected, the Applicant needs to be mindful of the Act as it also relates to potential dust generation during construction. This will be addressed in the EIA phase of the project and the necessary management and monitoring requirements will be included in the EMPr.

### **National Environmental Management: Waste Act (Act 59 of 2008 as amended)**

The National Environmental Management: Waste Act (NEMWA) came into effect on 1 July 2009. Section 19 of the NEMWA provides for listed waste management activities and states in Section 19(1) that the Minister may publish a list of waste management activities that have or are likely to have a detrimental effect on the environment. Such a list was published in GN 921 of 29 November 2013, identifying those waste management activities that require a Waste Management Licence in terms of the Act. Activities are defined within Category A (non-hazardous) and Category B (hazardous) Category C (lower threshold in terms of waste volumes) wastes. From a renewable energy perspective, only Category A is considered here. The activities listed under Category B are equivalent to those that require an EIA process stipulated in the EIA regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

### ***Aspect of Project***

There are no listed activities which require authorisation. The Applicant must ensure that all activities associated with the project address waste related matters in compliance with the requirements of the Act and must consult with the local municipality to ensure that all waste is disposed of at a registered landfill site. This will be addressed in the EIA phase of the project and the necessary management and monitoring requirements will be included in the EMPr.

### **National Water Act (Act 36 of 1998 as amended)**

The National Water Act (NWA) includes provisions requiring that a water use license be issued by the Department of Water & Sanitation (DWS) before a project developer engages in any activity defined as a water use in terms of the NWA. Water use definitions considered probably or possibly relevant to Renewable Energy projects in terms of the NWA, section 21 includes:

- Taking of water from a water resource;
- Storing of water;
- Impeding or diverting the flow of water in a water course;
- Engaging in a stream flow reduction activity;
- Engaging in a controlled activity (this includes the use of water for power generation purposes);
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course, or characteristics of a watercourse. This includes altering the course of a watercourse (previously referred to as a river diversion).

Construction of infrastructure within 500m of a watercourse will likely be required for the associated roads and cables.

### ***Aspect of Project***

An authorisation might be required in terms of Section 21 (c) and (i) in the form of either a General Authorisation (GA) or Water Use License Application (WULA). An application will only be submitted if the project is awarded preferred bidder status in terms of the REIPPPP.

An Aquatic Biodiversity Assessment will be included in the EIR.

### **National Environmental Management: Protected Areas Act (NEMPAA; Act 57 of 2003)**

The objectives of the National Environmental Management: Protected Areas Act 2003 (Act 57 of 2003) (NEMPAA) as amended by the National Environmental Management: Protected Areas Amendment Act 31 of 2004, are to:

- provide for the declaration and management of protected areas;
- provide for 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;
- provide for 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
- provide for the continued existence of South African National Parks.

The Act also provides for the maintenance and monitoring of declared protected areas. The CA responsible for administrating the NEMPAA is dependent on the province in which the activity is taking place.

### ***Aspect of Project***

The study area is not located within or adjacent to a protected area in terms of this Act. No further action is required.

### **National Heritage Resources Act (No. 25 of 1999)**

National Heritage Sites in South Africa are places that are of historic or cultural importance, and which are for this reason declared in terms of Section 27 of the National Heritage Resources Act (NHRA). The designation was a new one that came into effect with the introduction of the Act on 1 April 2000 when all former National Monuments declared by the former National Monuments Council and its predecessors became provincial heritage sites as provided for in Section 58 of the Act.

Both national and provincial heritage sites are protected under the terms of Section 27 of the NHRA and a permit is required to work on them. National Heritage Sites are declared and administered by the national Heritage Resources Authority, SAHRA whilst provincial heritage sites fall within the domain of the various provincial heritage resources authorities, in this case the Northern Cape Provincial Heritage Resources Authority Ngwao Boswa Kapa Bokone (NBKB). Heritage resources are protected by the Act and may not be disturbed in any way without a permit issued by the South African Heritage Resources Agency or the relevant Provincial Heritage Resources Authority. Section 38(1) of the NHRA stipulates the triggers which would require a Heritage Impact Assessment (HIA) to become part of an EIA submitted for consideration by the relevant state department.

### ***Aspect of Project***

SAHRA must be informed of the project and a Heritage Impact Assessment (HIA) must be undertaken by a qualified specialist. A HIA will be included in the EIR.

### **Northern Cape Nature Conservation Act (NCNCA; Act 9 of 2009)**

Numerous sections (specifically sections 50-51) under NCNCA deal with indigenous and protected plants. The protected status of various species that may be located on the site requires a permit under NCNCA in order for the plants to be removed or destroyed i.e. a permit is required before development may commence.

### ***Aspect of Project***

A Terrestrial Biodiversity Assessment will be included in the EIR. Where required, permits will be applied for in terms of the NCNCA.

### **Conservation of Agricultural Resources Act (CARA; Act 43 of 1983)**

The purpose of this Act is to ensure that natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants.

### ***Aspect of Project***

As per the Screening Tool generated, the Agricultural Potential is considered low. There are currently no agricultural activities, not even grazing, taking place on the property. Where required, measures for addressing erosion, protection of vegetation and water sources and managing alien plants will be included in the EMPr.

### **Electricity Regulation 2006 (Act 4 of 2006) as amended by the ERAA in 2007)**

The Electricity Regulation Act (No 47 of 1999, as amended in 2007; RGA) provides a national regulatory framework for the electricity supply industry and makes the National Energy Regulator of South Africa the overseer and enforcer of the framework. The act requires registration and licensing of anyone wanting to generate, transmit, reticulate (i.e. network), distribute, trade, or import and export electricity. In addition, the act regulates the reticulation of electricity by municipalities

### ***Aspect of Project***

The proposed WEF is in line with the call of the Electricity Regulation Act as it has the potential to improve energy security of supply through diversification.

### **Municipal Systems Act (Act 32 of 2000)**

The Municipal Systems Act (No. 32 of 2000, MSA) concerns itself with the internal systems and administration of municipalities. The Act requires that the Constitution and other national level acts (e.g. NEMA) be incorporated into strategic planning at a municipal level. The CA responsible for administering the MSA is dependent on the municipality in which the activity is taking place.

Development at a local level is the primary focus as the act separates the responsibility of a service authority with that of a service provider; sets out the roles of officials and councillors, and provides for a range of requirements; including Integrated

Development Plans (IDPs), performance management and tariff setting. The Act accordingly regulates municipal service delivery and provides a comprehensive range of service delivery mechanisms through which municipalities may provide municipal services. It explains the process to be applied and the criteria to be considered in reviewing and selecting municipal service delivery mechanisms.

Under the Act, every municipal council must adopt a single, inclusive and strategic plan (i.e. IDP) for the development of the municipality. At a municipal level, these plans may call for the implementation of renewable energy projects and should be referenced in applications to motivate for relevant environmental authorisations. IPPs will need to consult with the various relevant municipal authorities and development plans as applicable to each specific project design and location.

### **Aspect of Project**

The proposed WEF development needs to be in line with the local and district municipalities IDPs. The Applicant needs to consult with the relevant municipalities throughout the process as a key stakeholder.

### **Spatial Planning and Land Use Management Act (SPLUMA; Act 16 of 2013)**

SPLUMA aims to confirm and regulate the role of municipalities in land-use planning and land-use management. Two of the most relevant objectives of the SPLUMA are to ensure that the system of spatial planning and land use management promotes social and economic inclusion and to provide for the sustainable and efficient use of land.

The Act provides that spatial planning consists of:

- Spatial development frameworks adopted at each level of government;
- Development principles, norms and standards;
- The management and facilitation of land use through land-use schemes; and
- Procedures to deal with and decide on development applications provided for in national and provincial legislation.

The national, provincial and local governments are instructed to adopt spatial development frameworks (SDFs). SDFs must 'guide planning and development decisions across all sectors'. At different levels of government the SDFs intended to guide some of the following:

- National Spatial Development Framework (NSDF) - must indicate the desired patterns of land use in South Africa;
- Provincial Spatial Development Framework (PSDF) - must provide a spatial representation of the province's land development policies, strategies and objectives and must indicate desired and intended patterns of land use and, importantly, delineate areas in which development would not be appropriate;
- Regional Spatial Development Framework (RSDF) – will be imposed if when a municipality fails to adopt or amend an MSDF the Minister may step in, declare a region and adopt an RSDF for that region and when it is 'necessary to give effect to national land-use policies or priorities' the Minister may do the same; and
- Municipal Spatial Development Framework (MSDF) - identify current and future significant structuring and restructuring elements of the spatial form of the municipality, including development corridors, activity spines and economic nodes where public and private investment will be prioritised and facilitated.



**Aspect of Project**

The proposed development needs to comply with the surrounding landscape, and must apply for a land use change with the relevant municipality since the land is classified as agricultural use.

**National Roads Act (Act. 93 of 1996)**

This Act provide for co-operative and co-ordinated strategic planning, regulation, facilitation and law enforcement in respect of road traffic matters by the national, provincial and local spheres of government.

The National Roads Act 93 OF 1996 makes provision for regulating the transportation of dangerous goods and substances by road. Section 275 states that, no person shall operate on a public road any vehicle in or on which dangerous goods is transported, unless such dangerous goods is transported in accordance with Chapter VIII of the Act. Chapter VIII also incorporates the SABS standard specifications relating the transportation of dangerous goods and substances. Section 279 indicates the availability of an authority for classification and certification of dangerous goods should there be any doubt as to the appropriate classification of dangerous goods.

Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations.

**Aspect of Project**

Due to the large size of many of the wind energy facility's components (e.g. tower and blades) they will need to be transported via "abnormal loads". A Traffic and Transport Impact Assessment will be included in the EIR. Comment from the Northern Cape Department of Transport is required.

**Astronomy Geographic Advantage Act (Act 21 of 2007)**

The Astronomy Geographic Advantage Act 21 of 2007 aims:

- to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy;
- to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and
- to provide for matters connected therewith.

In February 2010, the Minister of Science and Technology declared all land in the Northern Cape Province situated 250km from the centre of the South African Large Telescope (SALT) dome as an astronomy advantage area for optical astronomy purposes and the whole of the territory of the Northern Cape Province, excluding Kimberly, as an astronomy advantage area for radio astronomy purposes.

Furthermore, those parts of the Northern Cape which are to contain the SALT dome, the MeerKAT radio telescope and the multi-billion rand Square Kilometre Array (SKA) have been declared as core astronomy advantage areas. While all land within a 3km radius of the centre of the SALT dome falls under the Sutherland Core Astronomy Advantage Area, sections of the Kareeberg and Karoo Hoogland municipal areas, consisting of three sections of farming land, constitute the Karoo Core Astronomy Advantage Area.

From a renewable energy perspective, one activity which may potentially be at odds with the objects of the Act is that of the use of wind turbines. There is a possibility that the power generation equipment used in harnessing wind energy may result in electromagnetic interference with radio astronomy observations. In addition, there is a possibility that the turbine blades will reflect distant radio signals from other transmitters onto the radio telescopes and act as secondary transmitters. This may result in detrimental effects to any radio astronomy facilities. The extensive power requirements of the SKA and the MeerKAT radio telescope are likely to play a prominent role in determining the extent to which the generation of electrical energy through the establishment of wind and solar power projects is to be permitted in the Northern Cape.

### ***Aspect of Project***

A radio frequency interference (RFI) and electromagnetic interference (EMI) assessment may be required. Comments from the MeerKAT and SKA are required.

### **Civil Aviation Act (Act 13 of 2009)**

Civil aviation in South Africa is governed by the Civil Aviation Act, 2009 (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SA CAA) as an agency of the Department of Transport (DoT). The SA CAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must thus be assessed by SACAA in terms of the SA CARs and South African Civil Aviation Technical Standards (SA CATS) in order to ensure aviation safety.

The Obstacle Evaluation Committee (OEC) which consists of members from both the SA CAA and South African Air Force (SAAF) fulfils the role of streamlining and coordinating the assessment and approvals of proposed developments or activities that have the potential to affect civil aviation, military aviation, or military areas of interest. With both being national and international priorities, the OEC is responsible for facilitating the coexistence of aviation and renewable energy development, without compromising aviation safety.

### ***Aspect of Project***

Comments from the OEC are required to ensure the safety of aircrafts.

### **Subdivision of Agricultural land (No. 70 of 2009)**

The Subdivision of Agricultural Land Act (Act No. 70 of 1970) controls the subdivision of all agricultural land in South Africa and prohibits certain actions relating to agricultural land. In terms of the Act, the owner of agricultural land is required to obtain consent from the Minister of Agriculture in order to subdivide agricultural land.

The purpose of the Act is to prevent uneconomic farming units from being created and degradation of prime agricultural land. The Act also regulates leasing and selling of agricultural land as well as registration of servitudes.

**Aspect of Project**

Approval will be required from the Department of Agriculture, Land Reform and Rural Development (DALRRD) for any activities on the land zoned for agriculture and any proposed rezoning or sub-divisions of agricultural land.

**Mineral and Petroleum Resource Development Act (No. 28 of 2002 as amended)**

Mineral and Petroleum Resources Development Act (MPRDA, Act No. 28 of 2002) makes provision for equitable access to and sustainable development of the South Africa's mineral and petroleum resources and to provide for matters connected therewith.

The objects of this Act are (amongst others) to:

- Give effect to the principle of the State's custodianship of the nation's mineral and petroleum resources.
- Promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa.
- Give effect to Section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development.

As per Section 27 (1) of the Act, the Department of Mineral Resources and Energy (DMRE) must grant permission for all mining operations. Both the removal of sand and/or stone from a borrow pit or quarry requires an application for a mining permit or a mining right.

Section 53 of the Act requires that Ministerial approval is attained for "any person who intends to use the surface of any land in any way which may be contrary to any object of this Act or is likely to impede any such object".

**Aspect of Project**

Any activities associated with the WEF requiring extraction of sand or hard rock for construction purposes will require the submission of an application to DMRE for either a mining permit or mining licence. The Botterblom WEF must seek approval to use the land for the purposes of the WEF from the Minister.

**The Occupational Health and Safety Act (Act 85 of 1993)**

The objective of this Act is to provide for the health and safety of persons at work. In addition, the Act requires that, "as far as reasonably practicable, employers must ensure that their activities do not expose non-employees to health hazards". The importance of the Act lies in its numerous regulations, many of which will be relevant to the proposed Albany WEF. These cover, among other issues, noise and lighting.

**Aspect of Project**

The Applicant must be mindful of the principles and broad liability and implications contained in the OHSA and mitigate any potential impacts. The necessary management and monitoring requirements will be included in the EMPr.

### 3.3.1 Planning Context

South Africa's National Development Plan (NDP) 2030 offers a long-term plan for the country. It defines a desired destination where inequality and unemployment are reduced and poverty is eliminated so that all South Africans can attain a decent standard of living. Electricity is one of the core elements of a decent standard of living.

The NDP envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through reduced emissions and pollution. In formulating its vision for the energy sector, the NDP took as a point of departure the Integrated Resource Plan (IRP) 2010–2030 promulgated in March 2011.

The renewable energy industry has substantial support in the South African planning context, which is detailed in the following national and provincial plans:

- National Development Plan 2030;
- National Integrated Resource Plan for Electricity (2010-2030);
- Integrated Resource Plan (IRP 2019)
- National Infrastructure Plan 2012, as amended;
- Northern Cape Provincial Growth and Development Strategy (PGDS);
- Northern Cape Provincial Spatial Development Framework (PSDF); and
- Northern Cape Climate Change Response Strategy

More specifically, the proposed Botterblom WEF falls within the jurisdiction of the Hantam Local Municipality and the Namakwa District Municipality. An evaluation of the 'need and desirability' of the project (Section 2.3) considers the strategic context of the project with regard to the municipal Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) as follows:

- Namakwa District Municipality IDP 2020-2021;
- Namakwa District Municipality SDF 2012;
- Namakwa District Municipality Local Economic Development (LED) strategy; and
- Hantam Municipality IDP 2020 – 2021.

### 3.3.2 Policy Context

In South Africa, the national utility company, Eskom, sources up to 77% of its electricity needs from coal. Against the backdrop of heightened climate change awareness and a growing concern around the reliance and environmental impacts of using fossil fuels, as well as an increasing projected electricity demand in the country, a number of policies were developed that aim to diversify the electricity generation mix for South Africa. These include the White Paper on the Energy Policy of the Republic of South Africa (1998), the White Paper on Renewable Energy (2003) and the National Climate Change Response Policy White Paper (2011).

However, despite the proactive policy stance from the early 2000s, by the end of the decade there was an electricity shortage that resulted in rolling black outs since 2008. In direct response to these electricity shortages, the IRP was issued as a medium-term strategy which set the target for renewable energy supply to 17.8 Gigawatts (GW) over a 20-year period from 2010 to 2030.

This will contribute to 42% of all new electricity capacity and included specific allocations for the various types of renewable energy through subsequent ministerial determinations from the Department of mineral resources and energy (DMRE). These renewable energy targets are procured through a competitive tendering process called the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) run by the DMRE, which commenced in 2011. The REIPPPP is highlighted as a significant policy for enabling achievement of climate change mitigation goals under South Africa's INDC. The success of this programme has been internationally recognised, with the United Nations Environmental Programme (UNEP) 2014 Report placing South Africa among the top-10 countries in respect to renewable energy investment. The procurement of new, renewable energy, generation capacity from Independent Power Producers (IPPs) in order to meet the national commitment of transition to a low carbon economy and ensure security of energy supply. The target of 26 030 MW of installed capacity from PV and Wind resources, as indicated in the Integrated Resource Plan of 2019, will be met through a rolling procurement plan by 2030.

The proposed Botterblom WEF would therefore have both national and global significance as it aligns with national policy direction as well as contributing to South Africa being able to meet some of its international climate change obligations, by aligning domestic policy with internationally agreed strategies and standards as those set by the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, as well as the recent Convention of the Parties (COP) 21 in Paris 2015, to all of which South Africa is a signatory.

### 3.4 LEGAL REQUIREMENTS AS PER THE EIA REGULATIONS, 2014 (AS AMENDED)

NEMA, as amended, establishes the principles for decision-making on matters affecting the environment. Section 2 sets out the National Environmental Management Principles which apply to the actions of organs of state that may significantly affect the environment. Accordingly, NEMA identifies activities that require authorisation prior to commencement. Such activities listed in the 2014 EIA Regulations (as amended in 2017) are detailed in Table 3-2.

*Table 3-2: Listed activities triggered by the proposed Botterblom Wind Energy Facility.*

Government Notice	Activity Number	Description	Aspect of the Project
Listing Notice 1: R.327 as amended on 7 April 2017	11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;	Underground cables for the transmission of electricity generated by the turbines to the onsite switching station.
	12	The development of – (ii) infrastructure or structures with a physical footprint of 100 square meters or more;	The proposed turbines and associated infrastructure including access roads and laydown areas during the construction phase

Government Notice	Activity Number	Description	Aspect of the Project
		where such development occurs- (a) within a watercourse; or (c) within 32 meters of a watercourse, measured from the edge of a watercourse	located within a watercourse or the 32m buffer area. The final placement of all infrastructures will be refined during the process, and avoid the watercourse and indicated buffer as far as possible.
	14	The development and related operation of 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 80 cubic metres or more but not exceeding 500 cubic metres.	Storage of fuel, oil and other chemicals on site could trigger this activity. At present the volumes are not known but once information is available on the construction and operational phases of the project can the exact quantity be provided.
	19	The infilling or depositing of any material of more than 10 m <sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m <sup>3</sup> from a watercourse;	The infilling or depositing of any material of more than 10 m <sup>3</sup> into a watercourse may be triggered with the construction of internal service roads or cables across drainage lines.
	24	The development of a road -  (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	Roads are required throughout the construction and operational stages of the project. during the construction phase, roads will be approximately 12m wide for the delivery of turbine parts and other equipment, and approximately 8m wide during the operational phase for maintenance purposes.
	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:  (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	The current land use of the proposed farm on which the project is proposed is agriculture.

Government Notice	Activity Number	Description	Aspect of the Project
	56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre –  (ii) where no reserve exists, where the existing road is wider than 8 metres	The widening of portions of existing roads or the lengthening of roads will be required to accommodate the logistical construction requirements to access the site and associated infrastructure.
Listing Notice 2: R.325 as amended on 7 April 2017	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 Botterblom WEF will consist of up to 35 turbines with a capacity of up to 7.5MW each, depending on the available technology at the time of construction.
	15	The clearance of an area of 20 hectares or more of indigenous vegetation.	The total area to be cleared is expected to be approximately 55 ha, depending on the final layout. This includes turbine placement, roads, and other permanent infrastructure. During the construction phase, some areas will be cleared for the laydown, storage and assembly areas which will be rehabilitated post construction.
Listing Notice 3: R.324 as amended on 7 April 2017	4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. g. Northern Cape ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	A CBA runs through the study area and it is likely that roads will be constructed within this area, even if just crossings.  Roads will also be rehabilitated after the construction phase, where applicable.
	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 meters. g. Northern Cape ii. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;	A CBA runs through the study area and wetlands or watercourse is present throughout the study area.  The exact location of the storage and handling of dangerous goods are not yet known, but the necessary precaution will be taken and where possible these areas will be avoided. It is possible that this activity may become redundant after the necessary steps have been taken.

Government Notice	Activity Number	Description	Aspect of the Project
		iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	
	12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape ii. Within critical biodiversity areas identified in bioregional plans;	The proposed project will clear indigenous vegetation. The extent of the clearance within the CBA is currently unknown.
	14	The development of- (ii) infrastructure or structures with a physical footprint of 10 square meters or more; where such development occurs – (a) within a watercourse; or (c) within 32 meters of a watercourse, measured from the edge of a watercourse. g. Northern Cape ii. 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	The proposed turbines and associated infrastructure including access roads and laydown areas during the construction phase located within a watercourse or the 32m buffer area. The final placement of all infrastructures will be refined during the process, and avoid the watercourse and indicated buffer as far as possible within the CBA.
	18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. g. Northern Cape ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland	Upgrades of existing roads are likely to take place within the CBA and a watercourse. The exact roads for upgrade are currently unknown.



## 4 SCOPING AND EIR PROCESS

A S&EIR is conducted in two phases. The first phase is scoping and the second phase is the EIR. The scoping phase will commence once the environmental authorisation application has been submitted with the competent authority (in this case Department of Forestry, Fisheries and the Environment - DFFE). The following tasks will be undertaken for the scoping phase: identify stakeholders and interested and affected parties (I&APs); identify relevant policies and legislation; consider the need and desirability of the project; consider alternative technologies and sites; identify the potential environmental issues; determine the level of assessment and public participation process required for the EIA phase; and identify preliminary measures to avoid, mitigate or manage potential impacts.

The requirements for the submission of the scoping report to competent authority is specifically contained in Chapter 4 Part 3 of the NEMA Reg No 326 (amended on 7 April 2017). The S&EIR process can take up to 300 days to complete (87 days for scoping phase, 106 days for EIA phase, and 107 days for competent authority to review). The applicant must, within 44 days of receipt of the application by the competent authority, submit to the competent authority a scoping report which has been subjected to a public participation process of at least 30 days and which reflects the incorporation of comments received, including any comments of the competent authority. The competent authority must, within 43 days of receipt of a scoping report, make a decision

The purpose of the scoping report is to identify and evaluate the main issues and potential impacts of the proposed development at a detailed desktop level based on existing information.

### 4.1 APPROACH

There are two distinct phases in the S&EIR process namely the Scoping Phase and the EIR Phase, as outlined in Figure 4-1.

This report deals with the scoping phase. The requirements for the S&EIA process are specifically contained in Chapter 4 Part 3 of the EIA Regulations 2014 (as amended).

The scoping phase is conducted as the precursor to the Environmental Impact Assessment (EIA) process during which:

- Project and baseline environmental information is collated. Baseline information for the scoping report is gathered through visual inspections during field visits of the proposed project area and surroundings, desktop studies which include GIS mapping, and review of existing reports, guidelines and legislation.
- Landowners, adjacent landowners, local authorities, environmental authorities, as well as other stakeholders which may be affected by the project, or that may have an interest in the environmental impacts of the project are identified.
- Interested and affected parties (I&APs) are informed about the proposed project.
- Competent authority (CA) is consulted to confirm legal and administrative requirements.
- Environmental issues and impacts are identified and described.
- Development alternatives are identified and evaluated, and non-feasible development alternatives are eliminated.
- The nature and extent for further investigations and specialist input required in the EIA phase is identified.
- The draft and final scoping reports are submitted for review by authorities, relevant organs of state and I&APs.
- Key I&AP issues and concerns are collated into an issues and response report for consideration in the EIA phase.

Issues raised in response to the Draft Scoping Report (released for a 30-day comment period) was captured in a Comments and Response Report (Appendix C7) and included to this Final Scoping Report (FSR), which is submitted to the CA for decision-making (i.e. approval or rejection). If approved, it marks the end of the Scoping Phase after which the EIA Process moves into the impact assessment and reporting phase.

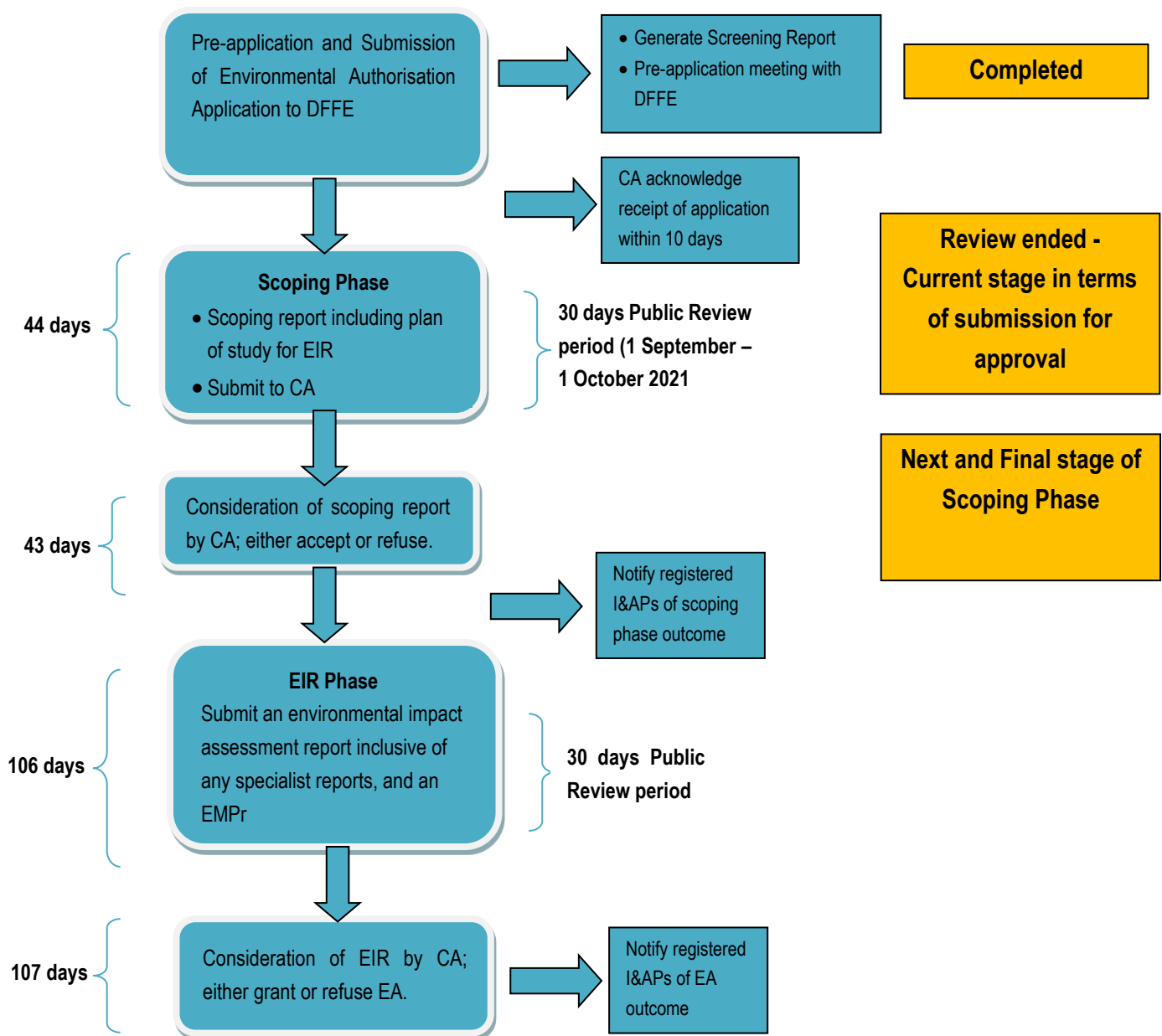


Figure 4-1: The S&EIR process in terms of the EIA Regulations (2014, as amended).

The content for the scoping report is included in Appendix 2 of the EIA Regulations 2014 (as amended). The scoping process can take up to 87 days, 44 days to submit the final scoping report to the CA and 43 days for the CA to review the scoping report.

## 4.2 SPECIALIST ASSESSMENTS

To provide a scientific assessment that is transparent and robust, a clear methodology is required as per the protocols for each environmental theme as highlighted by the screening report (Appendix G). It is necessary to take note that each specialist requires specific methodology to their investigation (scoping reports are included in Appendix E).

For more information on specialist assessments refer to Chapter 5.

## 4.3 PUBLIC PARTICIPATION

The Public Participation Process (PPP) was developed to ensure compliance with environmental regulatory requirements and to provide I&APs with an opportunity to evaluate the proposed project. During this process stakeholders can provide inputs and to receive feedback from the environmental specialists, other stakeholders and the competent authority. Please refer to Appendix C for the Public Participation Report.

### 4.3.1 Objectives of Public Participation

- Provide Stakeholders and Interested and Affected parties (I&APs) with an opportunity to voice their support or concerns and raise questions regarding the project, application or decision made by the CA;
- Provides an opportunity for I&APs, EAP and the CA to obtain clear, accurate and understandable information about the environmental, social and economic impacts of the proposed activity or implications of a decision;
- Provide Stakeholders, I&APs, and the CA with the opportunity of suggesting ways of reducing or mitigating negative impacts of an activity and for enhancing positive impacts;
- Enable the applicant / EAP to incorporate the needs, preferences and values of affected parties into the process and submitted reports for review.

### 4.3.2 Legislation

The PPP must comply with the several important sets of legislation that require public participation as part of an application for authorisation or approval, namely:

- The National Environmental Management Act (Act No. 107 of 1998 - NEMA);
- The EIA Regulations (2014, as amended);
- Disaster Management Act (57/2002): Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences published on 5 June 2020.

Adherence to the requirements of the above-mentioned Acts will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts. The details of the Integrated PPP are provided below.

Adherence to the requirements of the above-mentioned Acts and Regulations will allow for effective PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts.

The Directions as published by the Minister of DFFE on 5 June 2020 provides guidance when conducting public participation during the COVID-19 pandemic. All applicable health and safety and other restrictions, directions and requirements determined in terms of section 27(2) of the Disaster Management Act are relevant. At all times it must be ensured that reasonable opportunity is provided for public participation and that all administrative actions are reasonable. A compulsory Public Participation Plan (as required in Annexure 3 of the Directions) for pending applications must be submitted to the relevant assigned case officer for approval prior to commencement of PPP (see section below).

As per the Directions:

- “In ensuring the above, applicants and EAPs, in addition to the methods contained in Chapter 6 of the EIA Regulations, or as part of reasonable alternative methods proposed in terms of regulation 41(2)(e) of the EIA Regulations, may make use of the following non-exhaustive list of methods: emails, websites, Zero Data Portals, Cloud Based Services, or similar platforms, direct telephone calls, virtual meetings, newspaper notices, radio advertisements, community representatives, distribution of notices at places that are accessible to potential I&APs.”
- “Reports **may not** be made available at any public places or premises closed to the public, as contemplated in the Regulations. Hard copies or electronic versions of reports may be made accessible through any of the following non-exhaustive list of methods: websites, Zero Data Portals, community or traditional authorities, Cloud Based Services, provided that all registered I&APs have access to the reports.”
- “Unless part of a site visit, virtual or telephonic meetings to be arranged.”

#### 4.3.3 Public Participation Plan as submitted and approved by DFFE

The Public Participation Plan was submitted to the DFFE case officer on 6 April 2021 and was approved on the 7<sup>th</sup> of April 2021 (please refer to Appendix C for more details).

A summary of the Public Participation Plan, with regards to communication with the landowners and Interested and Affected Parties (I&APs) are as follows:

*Communication with landowners:*

- Face-to-face meetings will be avoided as far as possible.
- Communication will be via email, telephonic calls, and WhatsApp messages.
- Meetings will take place via virtual platforms such as Microsoft Teams or Zoom.
- Letters will be sent via post or hand delivered if necessary.

*Communication with Interested and Affected Parties (I&APs):*

- An advertisement in a local newspaper will be published.
- Site notices will be placed at prominent areas on the boundary fence of the properties.
- I&APs will be notified and will receive updates throughout the process via email or telephonic calls. Where necessary, registered post will be sent.
- All reports / documents will be made available electronically via the EAPs website. No hard copies will be made available at public locations, unless indicated otherwise by DFFE based on the published protocols. At this stage, no

communities within the study area or the immediate surrounding area have been identified, with the exception of landowners and individuals utilising the properties (such as farm workers or family members residing on the properties). It must however be indicated that internet connection in this area is generally slow and at times unreliable. In these cases, an electronic CD copy can be provided to affected people. Should other challenges arise during the dissemination of information during the process; this will be discussed with DFFE, and alternative measures will be proposed in order to address these limitations.

- Public meetings or open days will not be held. Should the need arise (depending on a number of factors), a virtual meeting can be arranged. Depending on the requirements for such a meeting, the specifics will be captured and discussed with DFFE. As mentioned, internet connection may be problematic for this area, and where necessary alternative arrangements will be made to ensure that all registered I&APs are given adequate opportunity to take part during the public participation process. Minutes of meetings will be captured and made available to all registered I&APs and the final minutes will be included in the scoping and EIA reports submitted to DFFE for decision making.
- All written comments received from registered I&APs will be captured in a Comments and Response Report.

At this stage, no other means of communication or alternatives have been identified. At all times, independent of the proposed methodology identified to conduct effective public participation, will the relevant protocols asset out by the Minister be adhered to.

#### 4.3.4 Identification of I&APs

An I&AP database will be compiled of key stakeholders and I&AP's identified for notification of the Environmental Authorisation Application. The I&AP database includes, amongst others; landowners, affected communities, regulatory authorities and other specialist interest groups. A list of key stakeholders is as follows:

- Competent Authority: Department of Forestry, Fisheries and the Environment (DFFE)
- Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
- Department of Water & Sanitation (DWS)
- Department of Mineral Resources and Energy (DMRE)
- Department of Agriculture, Rural Development and Land Reform
- Eskom
- South African Heritage Resource Authority (SAHRA)
- Namakwa District Municipality
- Hantam Local Municipality
- Hantam Local Municipality Councillor for Ward 5
- Vodacom
- MTN
- Civil Aviation Authority (CAA)
- BirdLife South Africa
- South African Bat Assessment Association (SABAA)
- Square Kilometre Array (SKA)

- Endangered Wildlife Trust (EWT)

#### 4.3.5 Notification and Registration of I&APs

The PPP commenced on 30 April 2021 with an advertisement in the local newspaper. All individuals who registered for this project has been added to the I&AP list, provided that they have given the correct and complete contact details in order to receive communications for this project. The notification procedure included (Appendix C):

- Newspaper advertisement: published in the Noordwester on 30 April 2021;
- Site Notices: erected at prominent points along the property boundaries and noticeable places on 8 May 2021; and
- Emails were composed and sent to the identified authorities, adjacent landowners, and I&APs that have registered thus far.

#### 4.3.6 Background Information Document

Included in the I&AP notification letters and e-mails sent out was a Background Information Document (BID) in both English and Afrikaans. The BID includes the following information:

- Locality map and description;
- Project description and background;
- Legal framework;
- Explanation of the Scoping and EIR Process to be followed; and
- Provide opportunity to get involve and comment on the proposed project.

#### 4.3.7 Consultation with I&APs

As no physical (in-person) meetings or open days are allowed during the COVID-19 pandemic, alternative measures has been and will be implemented to ensure that all relevant parties have an opportunity to take part in the PPP. Refer to section 4.3.3 for more details on this.

#### 4.3.8 Notification of availability of scoping report

All registered I&APs and stakeholders were notified via email of the availability of the Draft Scoping Report for review for a period of 30 days from **1 September to 1 October 2021**. A reminder email was sent on 30 September 2021. The report was available on Enviro-Insight's website at <http://www.enviro-insight.co.za/download-it/project-downloads/>. CD electronic copies are also available on request from Enviro-Insight.

#### 4.3.9 Feedback on scoping report

All comments received during the 30 day review period have been captured in the Comments and Response Report (Appendix C7). The EAP or relevant specialist provided feedback on the comments.

No comments were received from the Namakwa District Municipality, Hantam Local Municipality, Department of Mineral Resources and Energy, Department of Water and Sanitation or the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, during or after the 30 day review period.

It must be noted that a site visit was conducted with an official from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, with regards to sensitive flora and fauna and permit requirements for provincially protected species, on 11 October 2021.

## 5 DESCRIPTION OF THE RECEIVING ENVIRONMENT

A general description of the study area is outlined in the section below. The receiving environment in relation to each specialist study is also provided. During the Scoping Phase, sensitive areas are mapped for each environmental aspect and provided to the Proponent and design team. Based on this, the environmental sensitivities will be then avoided as far as possible in the placement of the turbines and associated infrastructure during the EIR phase.

The following environmental aspects (as per the screening report) are further described in the following subsections:

- Terrestrial Biodiversity;
- Sensitive Plant Species;
- Bats (wind);
- Avifauna (wind);
- Aquatic Biodiversity;
- Cultural Heritage and Archaeology;
- Agriculture;
- Socio-economic;
- Noise;
- Visual landscape including Flicker;
- Traffic and Transportation;
- Wake effect; and
- Electromagnetic and radio frequency interference.

For a more detailed understanding of the PAOI, the geology, climate and land cover need to be discussed. This will be the addressed first followed by the environmental aspects as per the screening report.

### 5.1 REGIONAL AREA

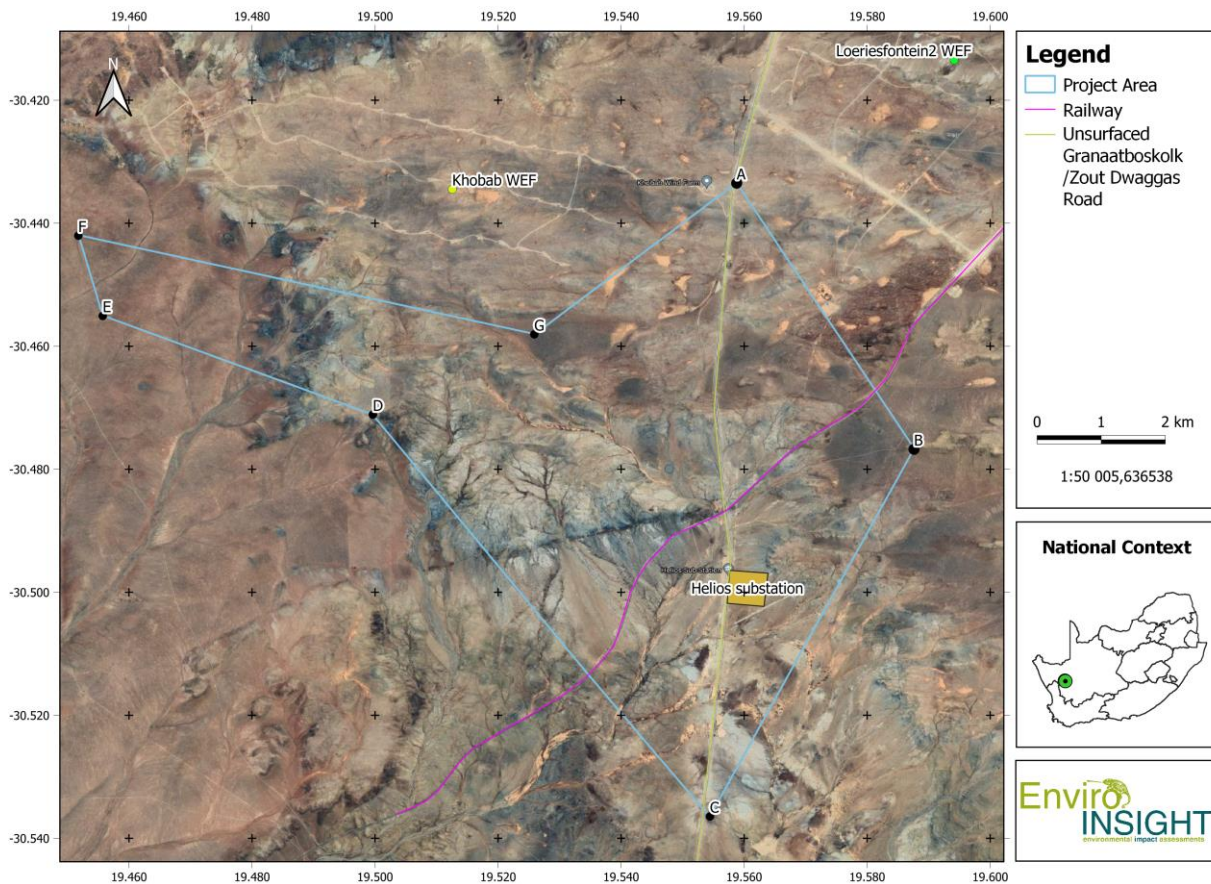
The proposed development will be located approximately 53km north of Loeriesfontein, 90 km west of Brandvlei and 105 km southeast of Springbok within the Hantam Local Municipality in the Northern Cape Province. The proposed wind farm can be accessed via unsurfaced Granaatboskolk / Zout Dwaggas Road, which branches off the R357 (Figure 1-1). The centre point and corner co-ordinates for the development site are included in Table 5-1 and Figure 5-1. The Project has a total footprint of approximately 5 736 ha situated on a Portion of the Remainder of the Farm Sous 226 (21-digit Surveyor General code: C0150000000022600000). The existing Khobab WEF is located directly north while Loeriesfontein2 WEF is located north-east of the study area.

**Table 5-1: Application Site of the Proposed Botterblom WEF Location.**

CORNER POINT COORDINATES		
POINT	LATITUDE	LONGITUDE
POINT-A	30°26'0.49"S	19°33'31.69"E
POINT-B	30°28'36.30"S	19°35'15.49"E
POINT-C	30°32'11.20"S	19°33'16.05"E
POINT-D	30°28'15.98"S	19°29'58.76"E
POINT-E	30°27'18.20"S	19°27'20.64"E
POINT-F	30°26'31.24"S	19°27'6.35"E
POINT-G	30°27'29.01"S	19°31'33.25"E

CENTRE POINT COORDINATES		
POINT	LATITUDE	LONGITUDE
MP	30°28'47.74"S	19°32'52.24"E



**Figure 5-1: The centre point and corner co-ordinates for the development site.**



## 5.2 CLIMATE

The area is dominated by the Cape Winter Season (cold fronts, resulting in soft, misty showers) and is characterised by semi-arid climatic conditions, with most of the rain falling at the start of autumn and during the winter. Rainfall for the area is given as a very low 147 mm per annum (Figure 5-2), while the mean annual temperature is 17.8°C (Figure 5-3).

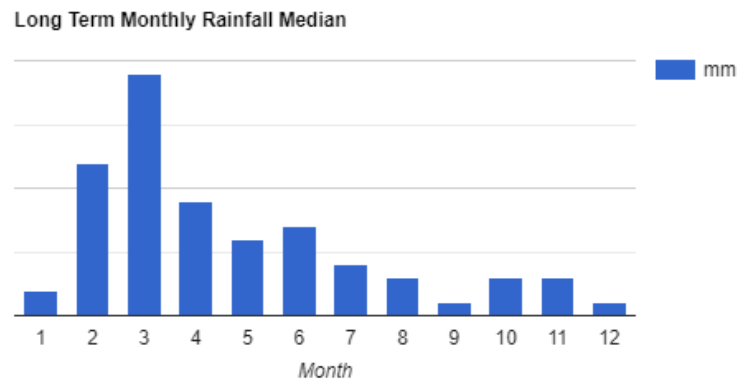


Figure 5-2: Long Term Climate Graph (1950 - 2000) (Source: CapeFarmMapper ver 2.6; R.E. Schulze, 2009).

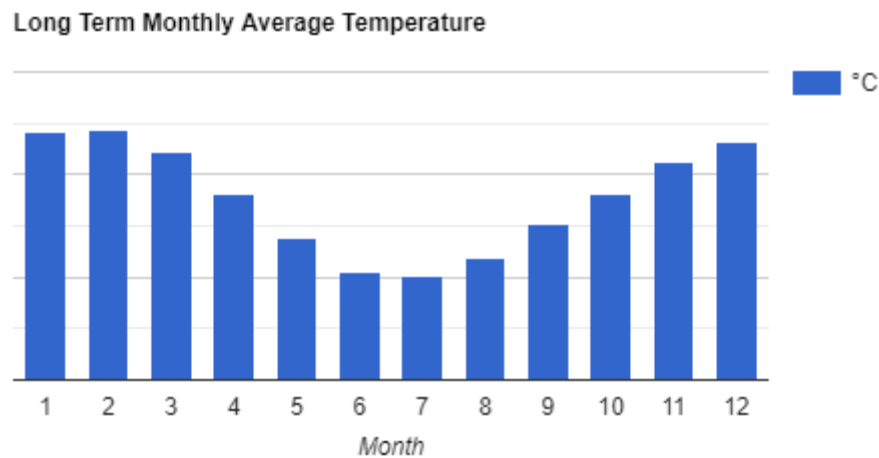
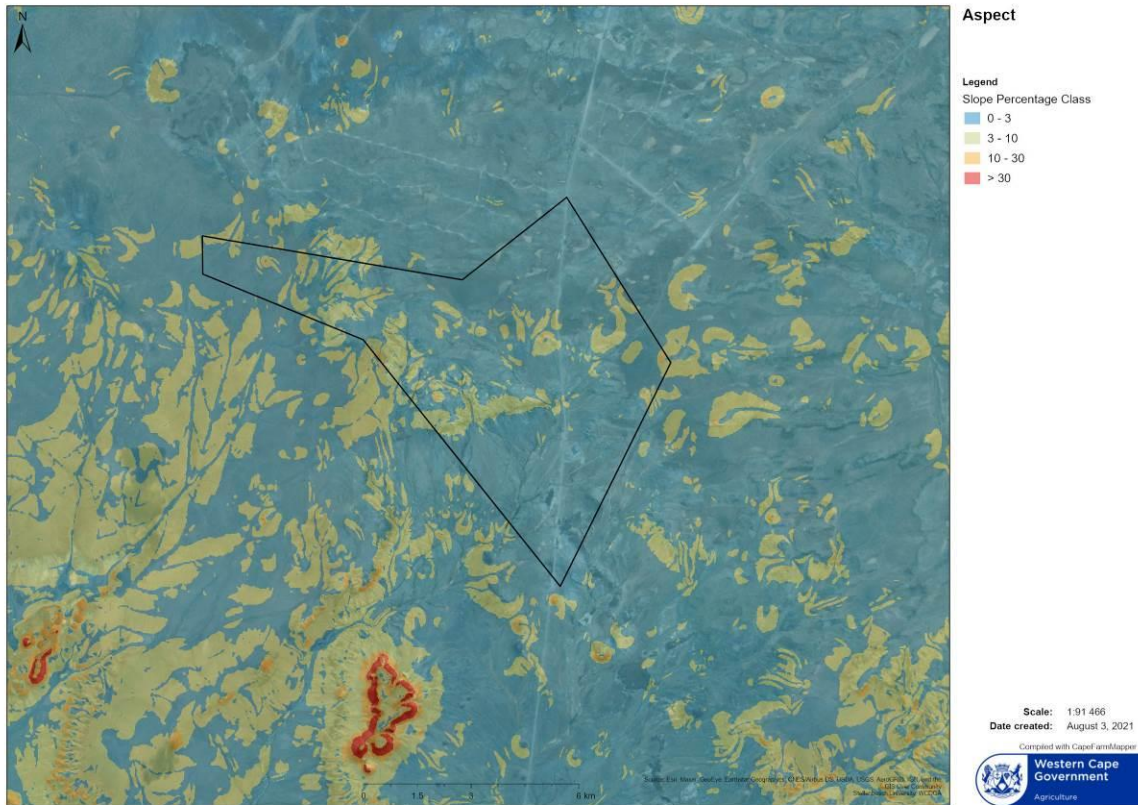


Figure 5-3: Long Term Climate Graph (1950 - 2000) (Source: CapeFarmMapper ver 2.6; R.E. Schulze, 2009).

## 5.3 TOPOGRAPHY

The area lies at a height of approximately 900 to 950 meters above sea level. The topography in the immediate vicinity of the site proposed for the wind farm is characterised by a flat to gently undulating landscape with gentle slopes (typical of much of the Karoo). North and north-east within the development footprint the presence of a number of pans signals that the topography is very flat and thus very poorly drained. In certain parts of the wider study area is characterised by the presence of localised hills / ridges / koppies which create areas of localised hilly topography. In addition, the Klein and Groot Rooiberg and Leeuwberg koppies can also be found within the wider area and form an area of localised hilly topography. The slope percentage grid was

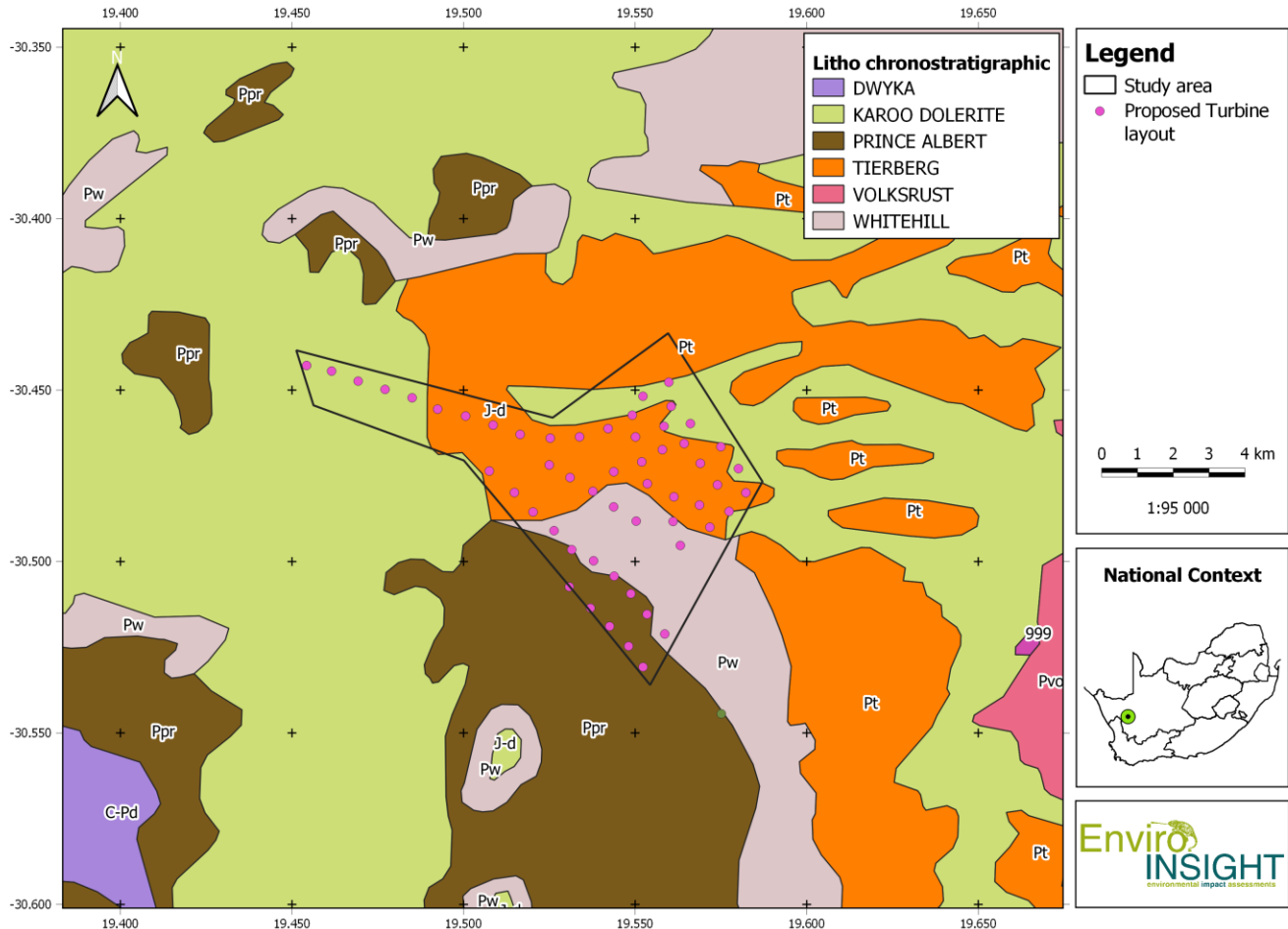
derived from the 20m SUDEM and classified into 4 categories for LandCare. The slope percentage for the majority of the development footprint is considered flat with localised steep slopes (Figure 5-4).



**Figure 5-4: Slope Percentage Class.** (Source: Stellenbosch University, WCDOA, accessed from CapeFarmMapper ver 2.6).

## 5.4 GEOLOGY

The underlying geology is shale of the Ecca and Dwyka Groups of the Karoo Supergroup with tillite of the Dwyka Group and dolerite intrusions. Several formations intersect with the development footprint (Figure 5-5), including grey shale with interbedded siltstones in the upper part (Tiegerberg), dolerite, minor ultrabasic rocks (Karoo Dolerite suite), grey shale, tuff, minor sandstone, chert, black (white-weathering) carbonaceous shale (Collingham and Whitehill) and dark grey-green shale (Prince Albert).



**Figure 5-5: Geological Classification of the proposed development footprint.**

### 5.5 LAND USE

Much of the land use in the wider study area is classified as bare (Other) with bare riverbed material embedded within it and dry pans towards the north. Vegetated areas include open woodland, low shrubland (Nama Karoo), sparsely wooded grassland and natural grassland. Other land uses within the study area include industrial (Helios substation) and extraction sites for open cast mines. Major roads (road from Loeriesfontein) and railway with associated infrastructure traverse the study area (Figure 5-6).

Sheep farming is the dominant activity in the area even though the arid nature of the climate restricts stocking densities which has resulted in relatively large farms across the area. There is no livestock grazing activities on the study area, and the landowner has not utilised the study area for any other purposes. Furthermore, the area is sparsely populated, and human-related infrastructure is largely restricted to isolated farmsteads and gravel access roads. There are no farmsteads that are occupied on the study area (Figure 5-7).

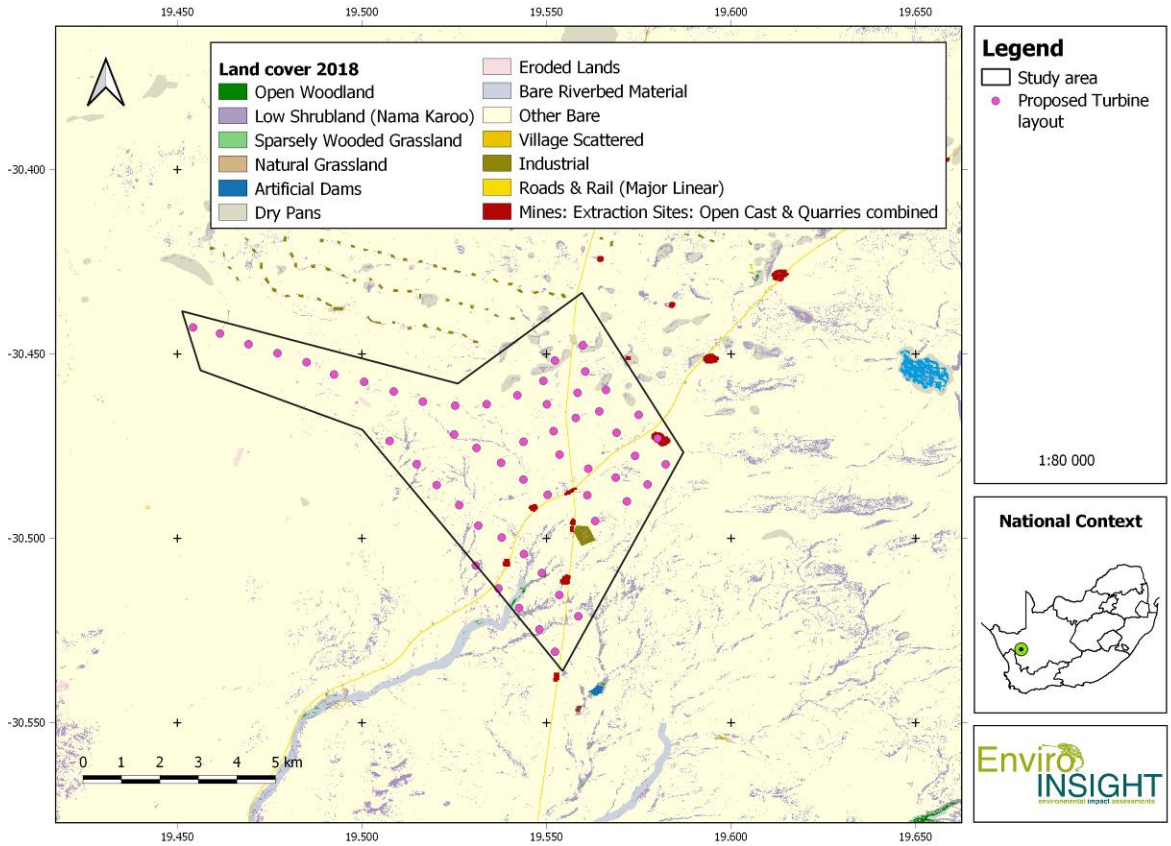


Figure 5-6: Land use in the region of the study area.



Figure 5-7: Abandoned farmstead on the study area.

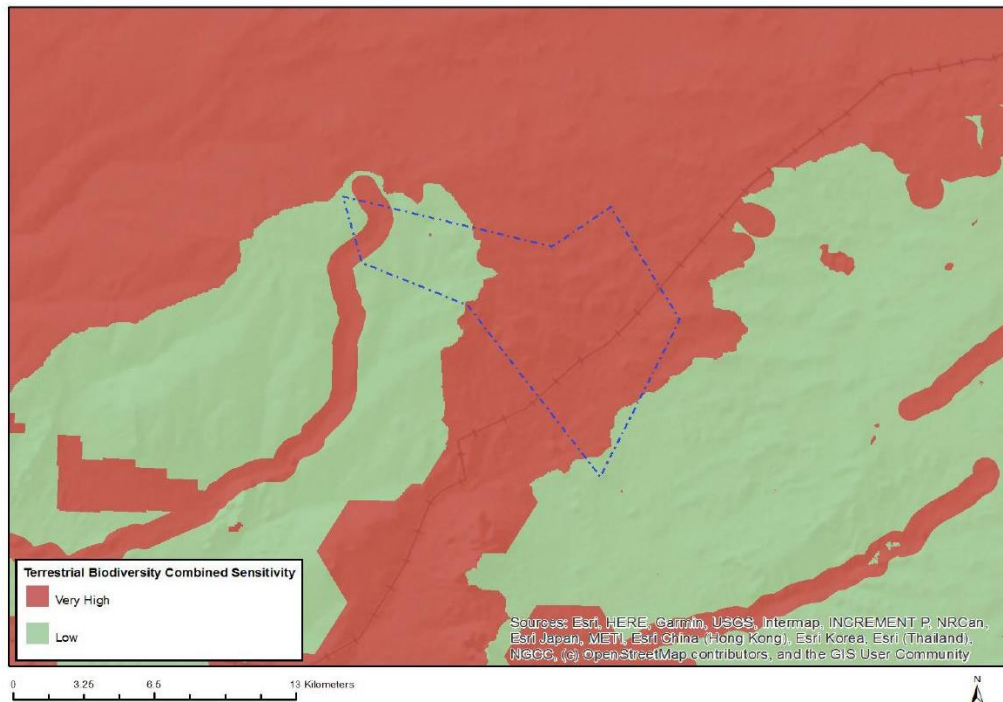
## 5.6 TERRESTRIAL BIODIVERSITY

The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. An initial screening report was generated in October 2020, and again in February 2021 as data updates were made and confirmation was required. For this report, the February 2021 screening report will be applicable.

Based on the screening report generated on 03/02/2021, the Terrestrial Biodiversity Combined Sensitivity Theme is indicated as **Very High** sensitivity (Figure 5-8). The sensitive features which trigger the Very High sensitivity include:

- Freshwater ecosystem priority area quinary catchments;
- Critical Biodiversity Area 1; and
- Ecological Support Area.

Accordingly, a Terrestrial Biodiversity Specialist Assessment must be conducted based on the Protocols (published on 20 March 2020).



**Figure 5-8: Screening Tool map of relative terrestrial biodiversity theme sensitivity.**

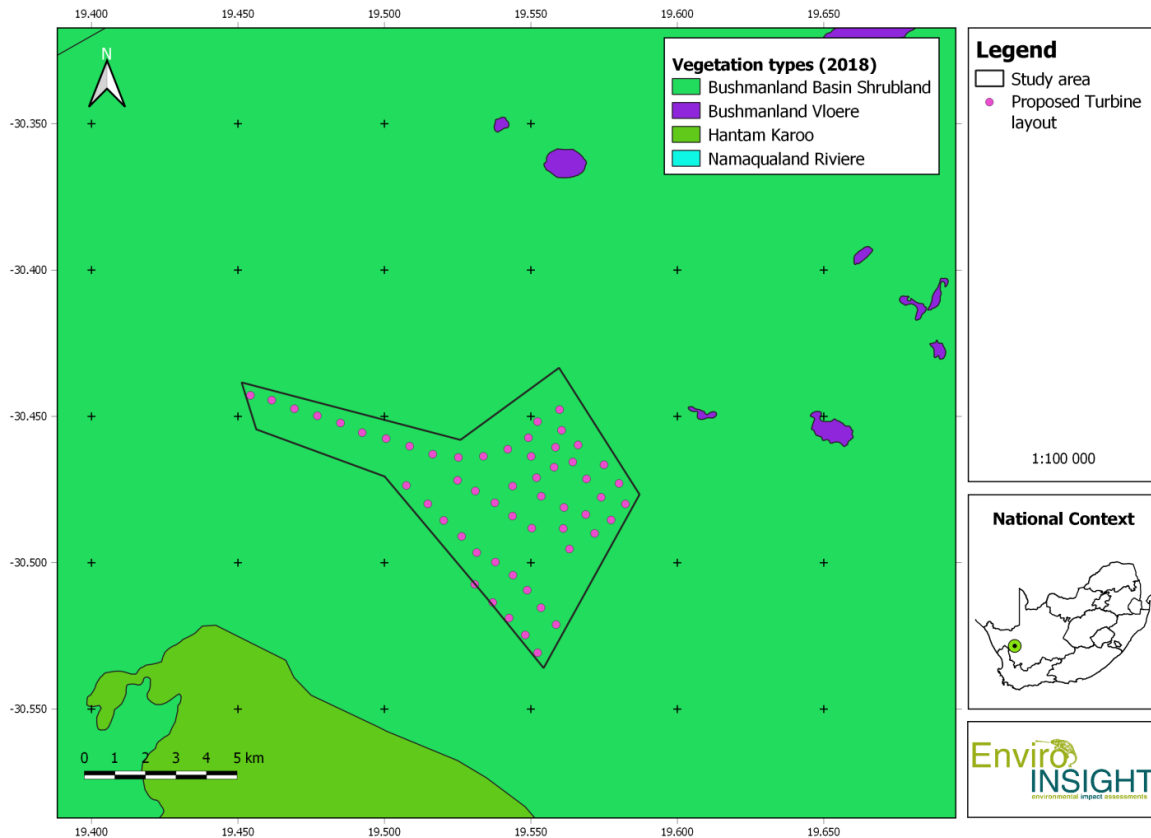
### 5.6.1 Regional Vegetation

The study area is located in the Bushmanland Basin Shrubland vegetation type (Figure 5-9) (Table 5-2). Bushmanland Basin Shrubland occurs on the extensive basin centered on Brandvlei and Van Wyksvlei, spanning Granaatboskolk in the west to Copperton in the east, and Kenhardt in the north to around Williston in the south. The area is characterised by slightly irregular plains dominated by a dwarf shrubland, with succulent shrubs or perennial grasses in places. The geology consists largely of mudstones and shales of the Ecca group and Dwyka tillites with occasional dolerite intrusions. Soils are largely shallow to non-existent, with calcrete present in most areas. Rainfall ranges from 100-200 mm and falls mostly during the summer months as thunder storms. As a result of the arid nature of the area, very little of this vegetation type has been affected by intensive agriculture and it is classified as Least Threatened. None of the unit is conserved in statutory conservation areas. According to Mucina and Rutherford no signs of serious transformation are present for the vegetation type, but scattered individuals of *Prosopis* sp. occur in some areas (e.g. in the vicinity of the Sak River drainage system), and some localised dense infestations form closed 'woodlands' along the eastern border of the unit with Northern Upper Karoo (east of Van Wyksvlei) (Mucina & Rutherford, 2006 as amended).

There are few endemic and biogeographically important species present at the site and only *Tridentea dwequensis* is listed by Mucina and Rutherford as biogeographically important while *Cromidon minimum*, *Ornithogalum bicornutum* and *O.ovatum* subsp *oliverorum* are listed as being endemic to the vegetation type (Mucina & Rutherford, 2006 as amended).

**Table 5-2: Attributes of the Bushmanland Basin Shrubland vegetation type.**

Name of vegetation type	Bushmanland Basin Shrubland
Code as used in the Book	NKb6
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	%
Remaining (percent of area) from NSBA	99.5%
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Not protected
Area (km <sup>2</sup> ) of the full extent of the Vegetation Type	34690.68
Name of the Biome	Nama-Karoo
Name of Bioregion	Bushmanland Bioregion



**Figure 5-9: Regional vegetation types in relation to the study area (SANBI, 2018).**

Other vegetation types which occur in the wider area include Hantam Karoo, some small pans in the area which fall within the Bushmanland Vloere and Namaqualand Riviere vegetation types. These are however outside of the study area and would not be affected directly by the proposed Botterblom WEF.

The study area is not located in a national threatened ecosystem, as confirmed in the screening report.

### 5.6.2 Northern Cape Critical Biodiversity Areas

The Northern Cape CBA Map (2016) identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness & Oosthuysen, 2016). Priorities from existing plans such as the Namakwa District Biodiversity Plan, the Succulent Karoo Ecosystem Plan, National Estuary Priorities, and the National Freshwater Ecosystem Priority Areas were incorporated. Targets for terrestrial ecosystems were based on established national targets, while targets used for other features were aligned with those used in other provincial planning processes.

Critical biodiversity areas (CBA's) are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of CBA's is to inform land-use planning in

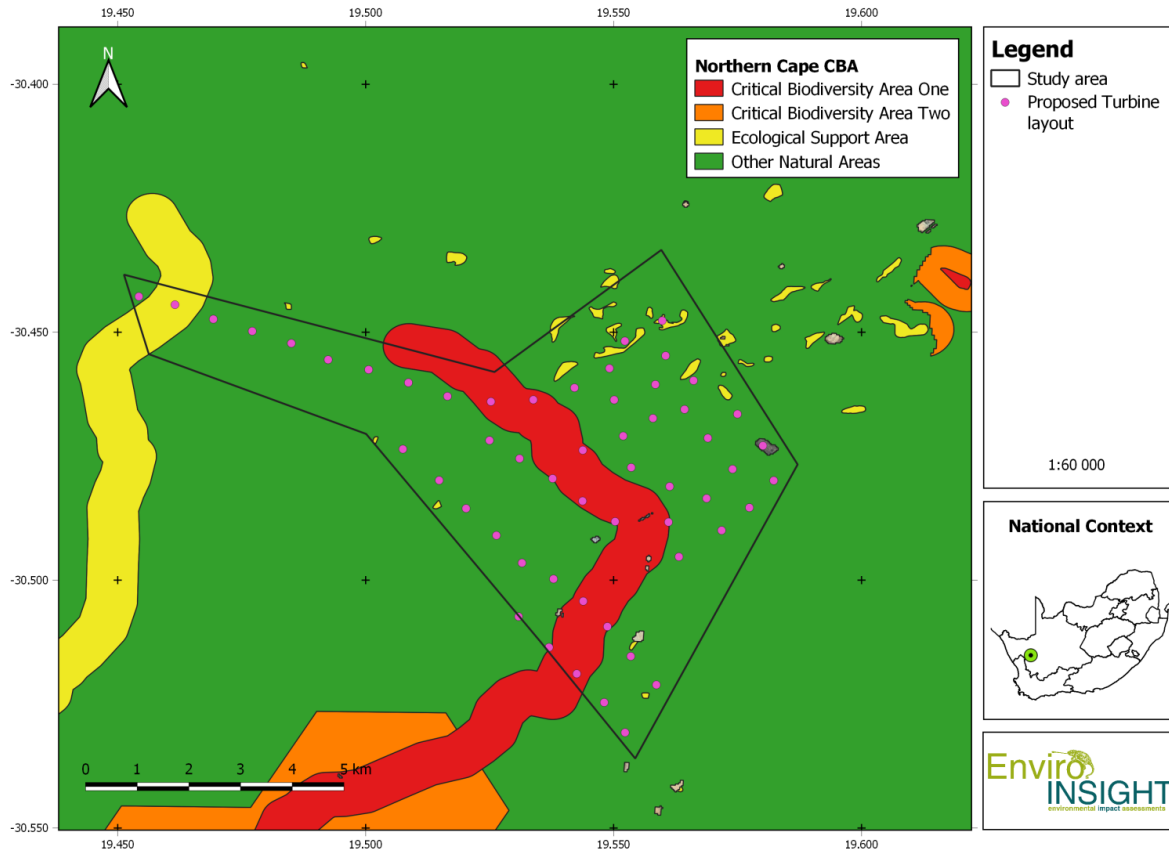
order to promote sustainable development and protection of important natural habitat and landscapes. Biodiversity priority areas are described as follows:

- *Critical biodiversity areas (CBA's)* are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBA's the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g. loss of a populations or habitat). All FEPA prioritized wetlands and rivers have a minimum category of CBA1, while all FEPA prioritised wetland clusters have a minimum category of CBA2.
- *Ecological support areas (ESA's)* are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas. For ESA's a change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

According to the CBA Map (Figure 5-10), the study area is mainly located in the category "Other Natural Areas" with a CBA1 running through the study area and an ESA in the western and northern sections of the study area. The CBA1 is the NFEPA River, Klein-Rooiberg running through the site. The ESA towards the western section is the Leeuwberg River, while the smaller scattered ESAs throughout the site are pans (natural non-FEPA Wetlands). From a Terrestrial Biodiversity perspective, these aquatic features represent important ecosystem functions and processes in the landscape, as they create niche habitats for both flora and fauna species.

The proposed development layout will be amended to avoid all CBA1 and ESA areas, or as indicated by the specialists.





**Figure 5-10: The study area in relation to the Northern Cape Critical Biodiversity Areas (2016).**

### 5.6.3 Significant terrestrial landscape features

The vegetation of the site is mostly homogenous and consists of flat to gently undulating open plains dominated by low shrubs and arid tussock grasses. It is typical of southwestern Bushmanland and does contain some remarkable landscape features such as pans and large hills. Other landscape features include low ridges and low gravel hills throughout the site, and some poorly developed drainage lines.

The largest section of the study area is located in a FEPA (Figure 5-11), with the Klein-Rooiberg FEPA river running through the study area, and a couple of FEPA wetlands classified as depressions, flats and seeps are located mainly in the northern section, bordering the Khobab WEF, and a few scattered throughout the site (Figure 5-12). A smaller section towards the south is classified as an Upstream Management Area (areas in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas). More information is provided under the Aquatic section.

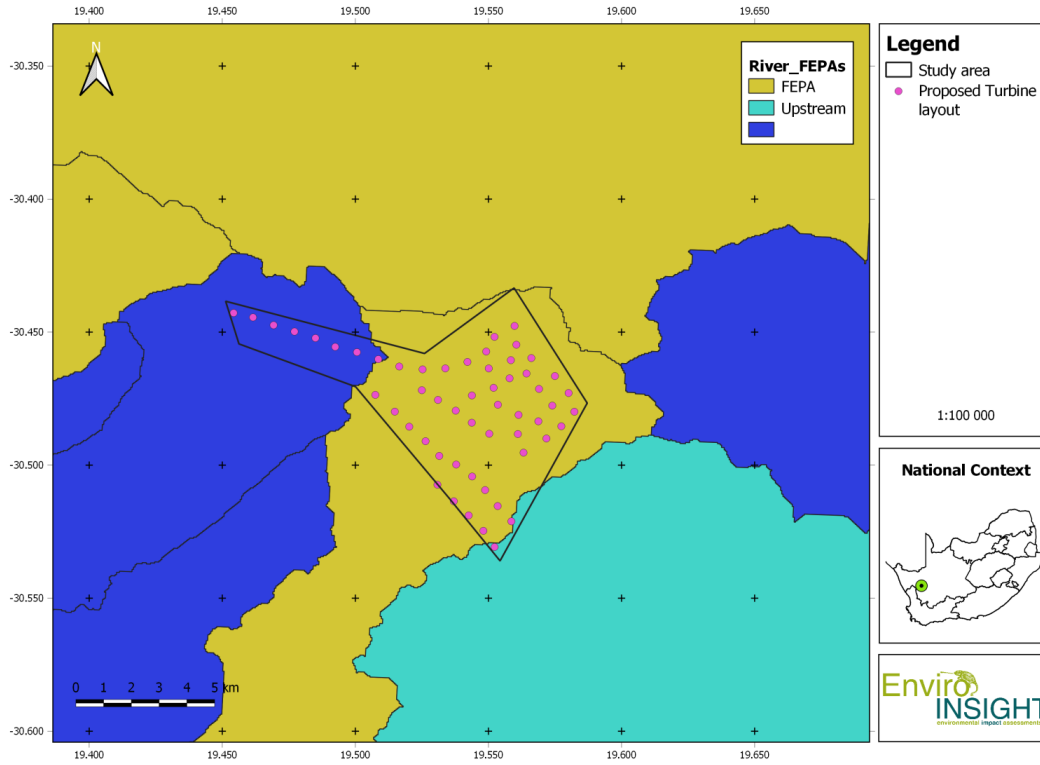


Figure 5-11: Freshwater Ecosystem Priority Areas.

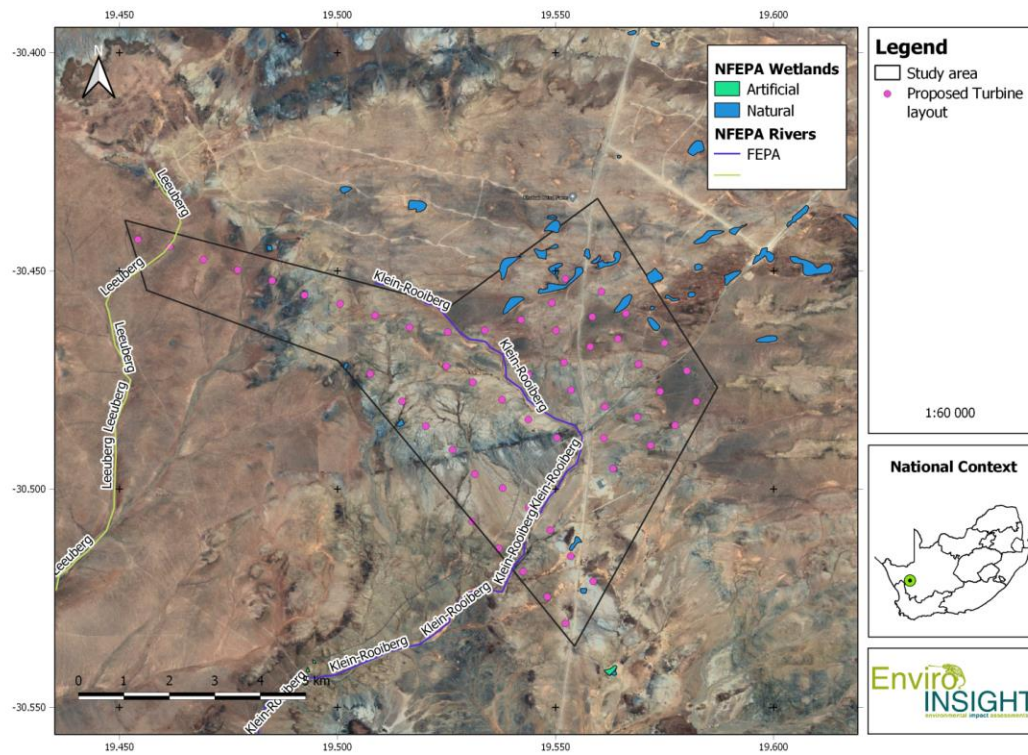
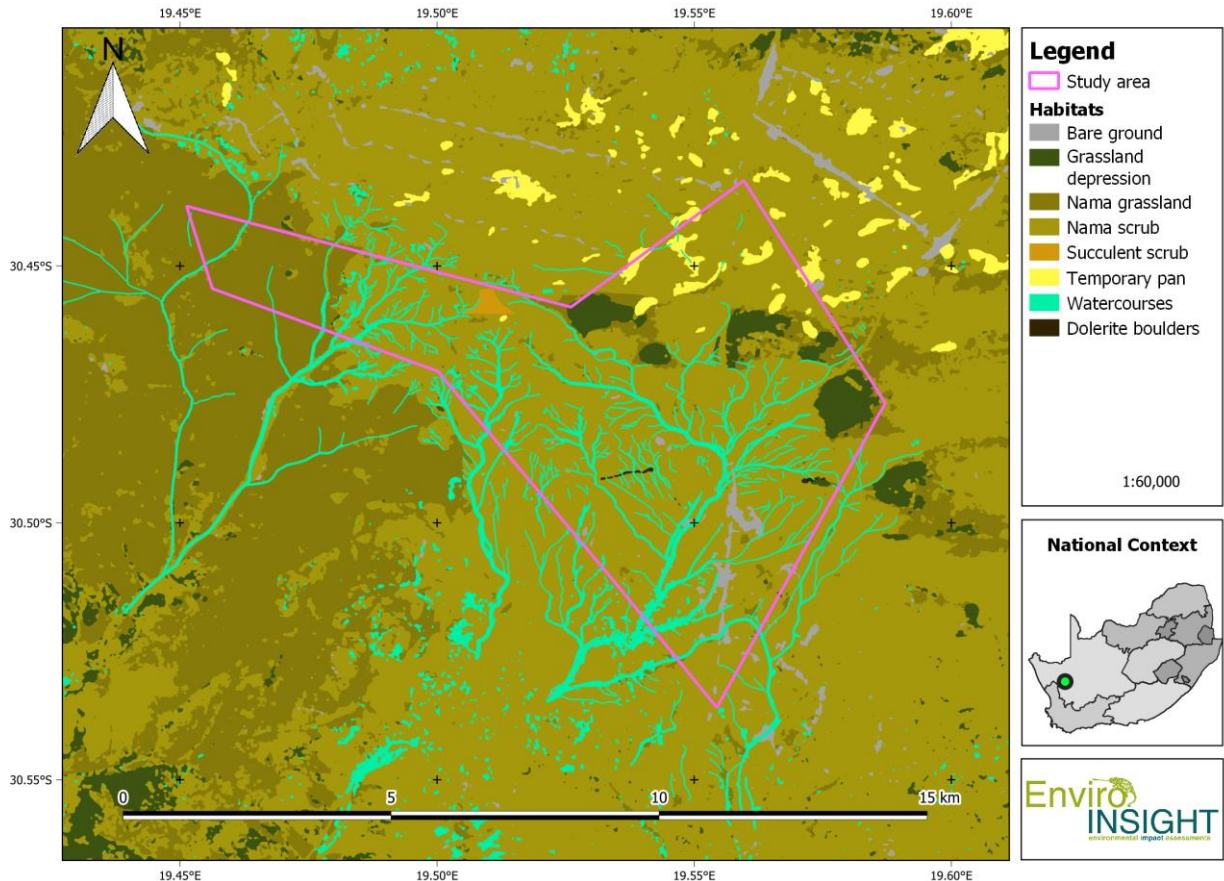


Figure 5-12: FEPA Rivers and wetlands.

### 5.6.4 Species and important habitats

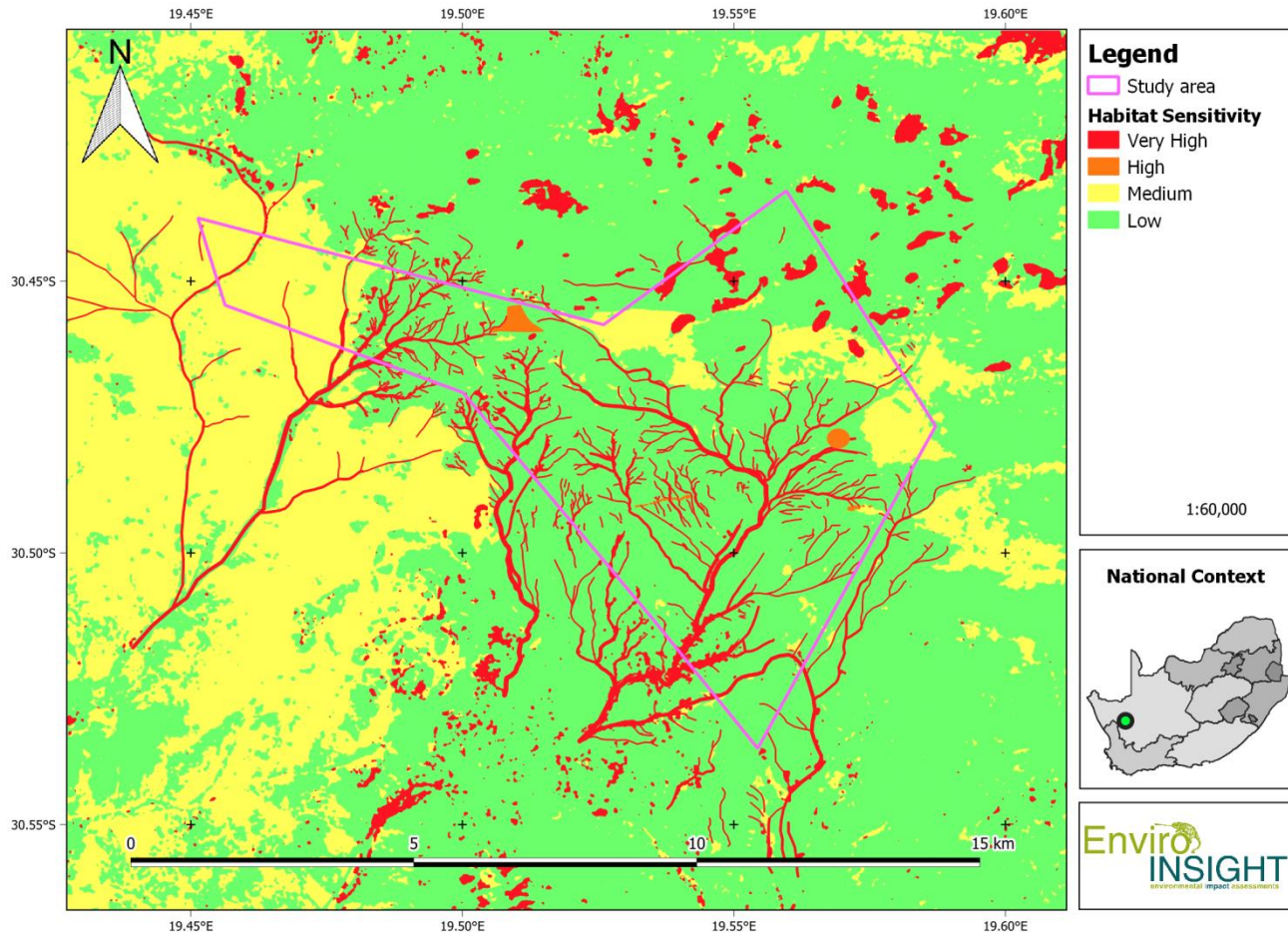
Plant diversity is generally low and the only areas with moderate levels of diversity at the ridges. Five main habitats were identified based on species composition and structure (Figure 5-13). Dominant and characteristic species were identified for each habitat, as well as alien invasive species and species of conservation concern (SCC). The latter is however addressed in section 5.7.



**Figure 5-13: Habitats identified for the study area.**

### 5.6.5 Preliminary sensitivity

A preliminary sensitivity map was generated for the study area, where low sensitivity is considered ideal for development and high sensitive areas should be avoided (Figure 5-14). Only the watercourse habitat is considered highly sensitive. A small patch of unique species is also regarded as high sensitivity along with the location of *A. dichotomum* and a 200m buffer area around it, where no development should take place as the species should ideally be protected *in situ*. Some of the smaller tributaries may still be downgraded to lower sensitivity after mitigation measures have been implemented. This will also be done based on the findings of the aquatic biodiversity assessment. The final sensitivity map will be presented in the EIA phase of the project.



**Figure 5-14: Preliminary Habitat sensitivity of the study area.**

The impacts of the proposed development will be assessed in the EIA phase, and will follow the mitigation hierarchy where avoidance will be considered first. As there are limited sensitive features and only a few SCC, the study area is not considered a core area for protection of these, and by implementing the necessary measures large sections of the study area still remain suitable for development for the wind farm. The conditions to be included in the EMPr will also be addressed in the EIA report as well as the final sensitivity map overlaid with the final layout.

## 5.7 PLANT AND ANIMAL SENSITIVE SPECIES

The Animal species theme is indicated as High sensitive due to the presence of sensitive avifauna species, while the remaining taxa groups are considered to be low (Figure 5-15). The avifauna component is addressed in a separate report (see section below) based on the specific protocol and guidelines. Accordingly, only a compliance statement is required.

The plant species theme initially indicated Medium sensitive due to the presence of sensitive species 44, but in the updated screening report this species was no longer listed but *Dregeochloa calviniensis* was listed (Figure 5-16). Accordingly, a full assessment was incorporated for this theme to account for all possible sensitive species likely to occur on site

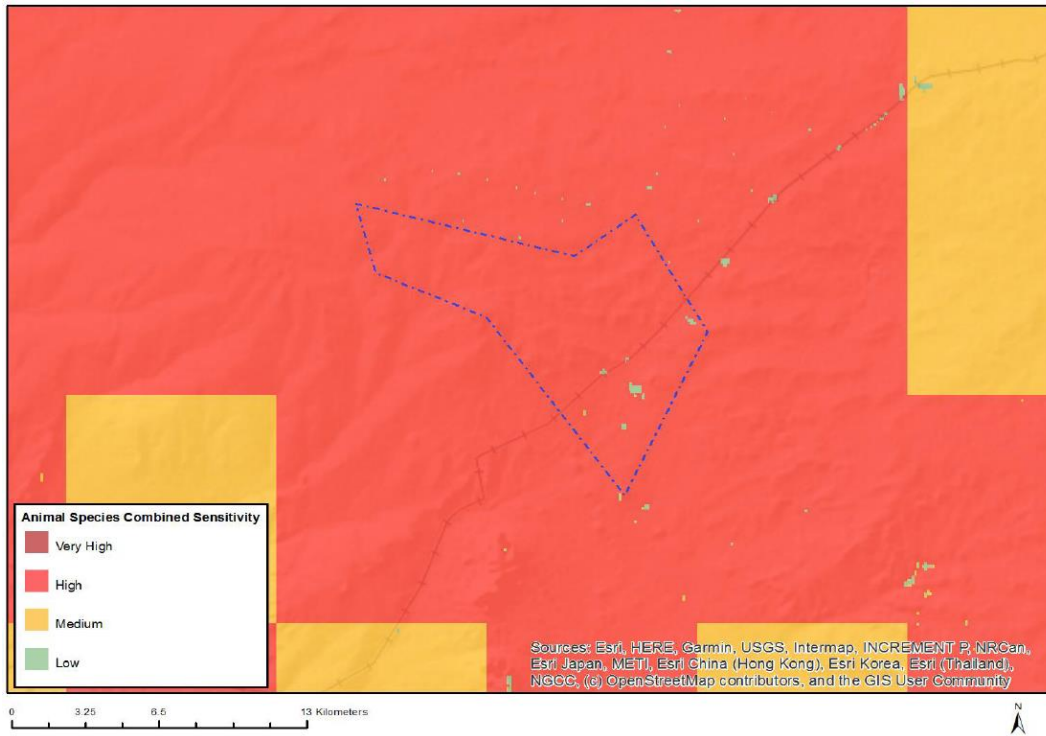


Figure 5-15: Screening Tool map of relative animal species theme sensitivity.

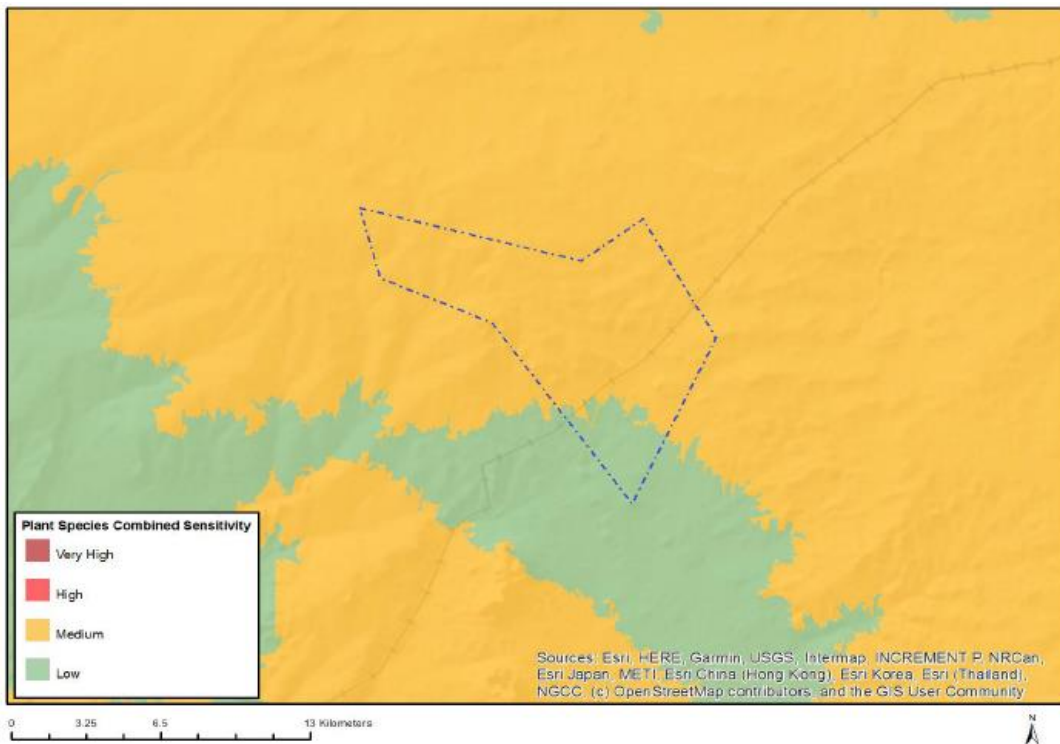


Figure 5-16: Screening Tool map of relative plant species theme sensitivity.

### 5.7.1 Sensitive Plant Species

As per the screening reports, two sensitive species are likely to occur on the study area. Based on existing literature and surveys conducting, two more species of conservation concern were included in this assessment (Table 5-3). One species listed as Rare, *Cephalophyllum fulleri* L.Bolus was indicated as being observed east of the proposed study area (exact location and distance unknown as limited information was provided in the specialist report; Todd 2018). This is, however, highly unlikely as this is a habitat specialist known from only three subpopulations close to Pofadder and Aggeneys, further north of the study area. Accordingly, this species was omitted for the current assessment.

**Table 5-3: Expected and Observed list of Sensitive Plant Species for Botterblom WEF**

Species	National Status	Provincially Protected	Endemic to (1) South Africa or (2) Northern Cape	Observed or likely to occur within the study area
<i>Aloidendron dichotomum</i> (Masson) Klopper & Gideon.F.Sm.	Vulnerable A3ce	Yes	No	One individual observed within the study area, two individuals observed on neighbouring properties to the west.
<i>Dregeochloa calviniensis</i> Conert	Rare		1 and 2	Low probability – was recorded approximately 52km SE of the study area.
<i>Hoodia gordonii</i> (Masson) Sweet ex Decne.	Data Deficient - Insufficient Information	Yes	No	Observed within the study area and on neighbouring properties.
<i>Wahlenbergia divergens</i> A.DC.	Data Deficient - Taxonomically Problematic		1 and 2	Unlikely – currently there is not enough information available for this species. Based on historical records, this species was recorded approximately 19km south of the study area, within the Hantam Karoo vegetation type.

*Aloidendron dichotomum* (Masson) Klopper & Gideon.F.Sm. – Vulnerable A3ce

This species occurs from Nieuwoudtville east to Olifantsfontein and northwards to the Brandberg in Namibia and is therefore not endemic to South Africa. It is known to occur on north-facing rocky slopes (particularly dolomite) in the south, and any slopes and sandy flats in the central and northern parts of its range. The main threats to this species include climate change, harvesting and trampling by livestock. Damage by baboons, scale insects and fungus has been observed, but none of these seem to cause mortality. Some social birds make large nest on the species, sometimes causing it to fall over due to the weight of the nests and its owners. Climate change models project a 36% decline in its range in 100 years, assuming dispersal into newly suitable areas. Patterns of modelled declines have been supported by field and repeat photo studies. However, no colonization of newly suitable areas has yet happened (Foden 2018). Without dispersal, the models predict a 73% decline in 100 years, qualifying the species as EN.

Only one individual was recorded within the PAOI (Figure 5-17) which is not impacted on by the proposed layout. The species will be protected *in situ* as per the Provincial gazette No 968 of 1 April 2005 in terms of the Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974) which prohibits the harvesting of this species.



**Figure 5-17: Aloidendron dichotomum recorded within the study area.**

*Dregeochloa calviniensis* Conert – Rare

This endemic species is known to occur in limestone outcrops in arid succulent karoo shrubland. It is a habitat specialist, occurring as localised subpopulations. It is a relatively unknown species from a poorly collected area. The type collection is from Handelskraal, ENE of Loeriesfontein. There are no known threats to the species. The species only flowers in October, thereby making identification out of season extremely difficult. The project does not represent a fatal flaw to the species, and if recorded on site, the necessary mitigation measures will be applied.

*Hoodia gordonii* (Masson) Sweet ex Decne.

The species occurs in a wide variety of arid habitats from coastal to mountainous, also on gentle to steep shale ridges, found from dry, rocky places to sandy spots in riverbeds. It is a widespread species (EOO 850,000 km<sup>2</sup>) but has undergone decline since 2001 as a result of indiscriminate harvesting for its appetite suppressant properties. International and national demand was particularly high between 2004 and 2006 and as a result of the high economic value of this species (price range between R500 and R1200 per kilogram at this time); even remote areas of its distribution range are suspected to have been harvested. Unfortunately, data do not exist to quantify the degree of decline to the population and as this species is widespread and can be locally common it is not possible to estimate overall population decline. Research on population recovery post harvesting and degree of impact of the harvesting over the past 10 years is required before this species can be accurately assessed. As a result of a decrease in demand for Hoodia internationally and the strict enforcement of new legislation to protect this species wild harvesting has declined in South Africa (Raimondo *et al.*, 2008).

Within the study area, the species is not abundant, and less than five individuals have been recorded on site, with about another five individuals recorded in the surrounding area. Where the proposed development requires the removal or destruction of the species, the necessary permit from the Provincial Department for its relocation is required.



**Figure 5-18: *Hoodia gordonii* recorded within the study area.**

In addition to these, there are several provincially protected species under the Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009) that occur on the study area which require permits for their removal from the Provincial Department. These include:

Schedule 1 species:

- *Hoodia gordonii*
- *Aloidendron dichotomum*
- *Sutherlandia* spp.
- *Pelargonium* spp.

Schedule 2 species:



- All species within the Aizoaceae family, which includes *Ruschia*, *Mesembryanthemum crystallinum*, *Drosanthemum spp.*, *Stomatium mustelinum*,
- All species within the Amaryllidaceae family, including *Boophone haemanthoides*
- All species within the Anacampserotaceae family, including *Anacampseros spp.*, *Avonia spp.*
- All species within the Oxalidaceae family, including *Oxalis spp.*,
- All species within the Apocynaceae family, including *Laryleachia cactiformis*, *Microlooma sagittatum*, *Tridentea jucunda*,
- All species within the Asphodelaceae family, including all *Aloe spp.* (except those listed in Schedule 1), *Gonialoe variegata*.

## 5.8 AVIFAUNA (WIND)

### 5.8.1 Description of Major Bird Habitats

The primary avifaunal habitats are described below. It is apparent throughout the study area that most of the habitats are generic in their ability to support general avifaunal species and Red-Listed / SCC with little differentiation. However, unique geological (such as red dunes) geographical or topographical features exist which may cause the areas these areas to be buffered from proposed development. Due to the high diversity and density of the above mentioned Red-Listed species recorded during the survey, (including regionally and globally listed Endangered and Vulnerable birds), the PAOI as a whole is considered to be an area of avifaunal importance and the EIA will be strongly associated with Guidelines at a policy level, prioritising avoidance mitigation and the monitoring of avifaunal SCC.

#### Watercourses and Drainage Lines

Avifaunal assemblages differed depending on the classification of the drainage line system as well as the season. Most of the drainage line systems are seasonally ephemeral or dry. Thus, most of the bird associations are linked to the prevailing vegetation and soil types within the delineated drainage line habitats. In summary, drainage lines with taller shrub and tree layers showed a much higher diversity of passerine species as well as sand-associates and ground-dwelling birds such as coursers and thick-knees. Species of conservation concern such as Red Lark and Sclater's lark were observed in varying densities.

The seasonal drainage lines and accompanying riparian trees are linear dispersal corridors for terrestrial bird species. Much higher species diversity (as well as a unique composition) was observed in this habitat and therefore, these systems are classified to be of high avifaunal importance. The drainage lines act as important flight corridors for passerines and raptors between foraging and roosting sites.

#### Nama Grassland

The open grassed karoo habitats show a reduced structural complexity and vegetation which provides for a more generic species diversity albeit often higher densities of avifauna. The habitat contains features similar to the Nama Scrub, namely open karoo habitats (including old, cultivated lands and some grassland areas) that provide suitable foraging habitat for Ludwig's Bustard (*Neotis ludwigii*), Kori Bustard (*Ardeotis kori*) and Secretary bird (*Sagittarius serpentarius*). However, the habitat is characterised by a much-reduced rocky substrate and a higher prevalence of grassed red sand infusions which provides optimal habitat for Red Larks.

## Nama Scrub/ Succulent Scrub

The stony and rocky ridges (ridges found more within the PAOI and not prevalent on the study area) act as prominent landmarks and foraging habitat for diurnal birds of prey. It also provides potential hunting habitat for all SCC eagles which hunts rock hyrax (common in these habitats) and rock rabbits as a staple of their dietary requirements. The localised high population densities of small mammals such as rock rabbits within the PAOI as well as the regional linkage to the koppie habitats, elevates the importance of this habitat for avifauna. The rocky habitats provide structural complexity not available in the open karoo vegetation which provides for an increase in species diversity and often higher densities of avifauna due to the prey species that are found in this habitats;. Boulder and/ or rocky habitats intersperse much of the Nama Scrub and provide suitable foraging habitat for the Ludwig's Bustard (*Neotis ludwigii*), Kori Bustard (*Ardeotis kori*) and Secretary bird (*Sagittarius serpentarius*).

## Transformed areas

Low density permanent structures, including bridges, railway tracks, gravel roads, homesteads consisting of houses, and kraals are present. These locations may be important for several bird species which use them for roosting and/or nesting, such as owls and swallows as well as valuable roosting and nesting habits for a wide spectrum of species ranging from the synanthropic (Pied Crows) to the Red-Listed (Martial Eagles).

Observations confirmed that a high density of birds, mainly raptors, can frequently be found associated with road infrastructure, possibly due to the prevalence of perching locations, such as electric or telephone lines running alongside available roads, or due to road kills (attracting scavenging species). However, species such as Ludwig's bustard would fly directly above large linear structures such as train tracks, presumably for the purpose of navigation. Finally, homestead and livestock related transformed areas act as attractants for both synanthropic and some Red-Listed species that seek water or food.

## 5.8.2 Observed and Expected Avifauna

### 5.8.2.1 Total species composition and abundance

The study area supports a relatively low diversity and abundance of avifauna, which is to be expected in an arid area like Loeriesfontein. A total of 93 species have been observed to date, as shown in Appendix 1. This low diversity is predominantly due to a number of factors including:

- High regional aridity which reduces the overall species diversity;
- Somewhat generic habitat types (albeit with some highly sensitive habitat such as red sands and temporary pans within the PAOI).
- Climate change which is characterised by lower rainfall and increased temperatures.
- A lack of standing water.
- An incomplete survey period (one year, still to be completed) which omits migrant species and seasonal water associates.
- Sub-optimal climate conditions experienced during the survey.

It must be noted that stochastic high rainfall events and other atypical prevailing influences (persistent cold) may influence the local avifaunal assemblages and that the dataset is currently not complete for all four seasons. The expected species list will thus be refined for the final EIA report following the collection of more data.

### 5.8.2.2 Priority species list

A list of expected and observed priority species (Retief *et al.* 2012) in the project area is provided in Table 5-4. A total of 24 priority species are expected to occur on and surrounding the study area, of which 14 have been recorded within the study area to date during this study. Lappet-faced Vulture is included given the sighting of two individuals within the greater PAOI although the species is a highly uncommon vagrant within the region.

Despite only completing two season's worth of fieldwork to date, it is clear from Table 5-4 that numerous priority avifauna species occur within the PAOI and can be expected to interact with the proposed Botterblom WEF. The recorded mortality incidence due to priority species colliding with turbines from the adjacent Khobab WEF over 2 years is considered to be of low concern due to a very small number (four) of threatened and identified priority species being killed (Chris van Rooyen Consulting, 2020). The four priority species mortalities were one incidence each of the Near Threatened Karoo Korhaan and priority species Spotted Eagle Owl with two Greater Kestrel mortalities. This was deemed not to be ecologically significant (Table 5-4). However, and as with all proposed WEF developments, it is vital to consider the context within which these species are observed in the current study, as congregatory behaviour, nesting behaviour and foraging behaviour may differ from that at the adjacent existing WEF facility. Indeed, Van Rooyen (2020) suggests that displacement effects of the WEF are more significant than direct mortality which can greatly affect habitat specific species such as Red Lark and Ludwig's Bustard. Consequently, all applicable data of priority species observed within the forthcoming monitoring seasons of field surveys will be collected in order to allow for careful evaluation of potential impacts and application of suitable mitigation measures to reduce these impacts where possible.

According to the literature, 15 Red-Listed species are known to occur in the region with nine species confirmed during the completed surveys, representing a very high success rate given the short study period (and considering the absence of migrants). Of the expected species and according to Taylor *et al.* (2015), two of the species are Endangered, seven of the species are Vulnerable species and four are Near-Threatened. For the current study, it was deemed unnecessary that all SCC should be discussed in greater detail until all the four monitoring seasons have been completed (Table 5-5). Specifically excluded from initial discussions was Lappet-faced Vulture (rare vagrant). Therefore, the selected relevant species that are possibly susceptible to the proposed development will be discussed in greater detail during the EIA phase, which will include specific (Guideline-based) recommendations for monitoring and mitigation. Photographic evidence of SCC observed during the current study is provided in Figure 5-19.

**Table 5-4: Priority avifauna species list (both expected and recorded as defined by Retief *et al.* 2012) for the study area.**

Common name	Scientific name	Priority species rank	Global Status	Regional Status	South African Endemic	Khobab WEF observed	Khobab WEF collision mortalities <sup>4</sup>	Current pre-construction monitoring
Bustard, Kori	<i>Ardeotis kori</i>	39	NT	NT				X
Bustard, Ludwig's	<i>Neotis ludwigii</i>	14	EN	EN		X		X

<sup>4</sup> Confirmed collision mortalities for the SEN WEF as reported in Arcus (2020) for the 4 year post-construction monitoring period May 2016 - May 2020.

Common name	Scientific name	Priority species rank	Global Status	Regional Status	South African Endemic	Khobab WEF observed	Khobab WEF collision mortalities <sup>4</sup>	Current pre-construction monitoring
Buzzard, Jackal	<i>Buteo rufofuscus</i>	43	LC	LC	X			
Courser, Burchell's	<i>Cursorius rufus</i>	69	LC	VU	X			
Courser, Double-banded	<i>Rhinoptilus africanus</i>	72	LC	NT				X
Eagle, Booted	<i>Aquila pennatus</i>	59	LC	LC				
Eagle, Martial	<i>Polemaetus bellicosus</i>	4	VU	EN		X		X
Eagle, Verreaux's	<i>Aquila verreauxii</i>	2	LC	VU				
Eagle-owl, Cape	<i>Bubo capensis</i>	42	LC	LC				
Eagle-owl, Spotted	<i>Bubo africanus</i>	98	LC	LC			X	X
Falcon, Lanner	<i>Falco biarmicus</i>	24	LC	VU				X
Goshawk, Southern Pale Chanting	<i>Melierax canorus</i>	75	LC	LC	X	X		X
Kestrel, Greater	<i>Falco rupicoloides</i>	95	LC	LC		X	X	X
Kestrel, lesser	<i>Falco naumanni</i>	64	LC	LC				
Kite, Black-winged	<i>Elanus caeruleus</i>	94	LC	LC		X		X
Korhaan, Karoo	<i>Eupodotis vigorsii</i>	51	LC	NT	X	X	X	X
Korhaan, Southern Black	<i>Afrotis afa</i>	37	VU	VU				X
Korhaan, Northern Black	<i>Afrotis afraoides</i>	90	LC	LC				X
Lark, Red	<i>Calendulauda burra</i>	40	VU	VU		X		X

Common name	Scientific name	Priority species rank	Global Status	Regional Status	South African Endemic	Khobab WEF observed	Khobab WEF collision mortalities <sup>4</sup>	Current pre-construction monitoring
Lark, Sclater's	<i>Spizocorys sclateri</i>	50	NT	NT				X
Secretarybird	<i>Sagittarius serpentarius</i>	13	EN	VU				
Snake- Eagle, Black-chested	<i>Circaetus pectoralis</i>	60	LC	LC				
Stork, Black	<i>Circonia nigra</i>	10	LC	VU				
Vulture, Lappet-faced	<i>Torgos tracheliotus</i>	19	CR	CR				

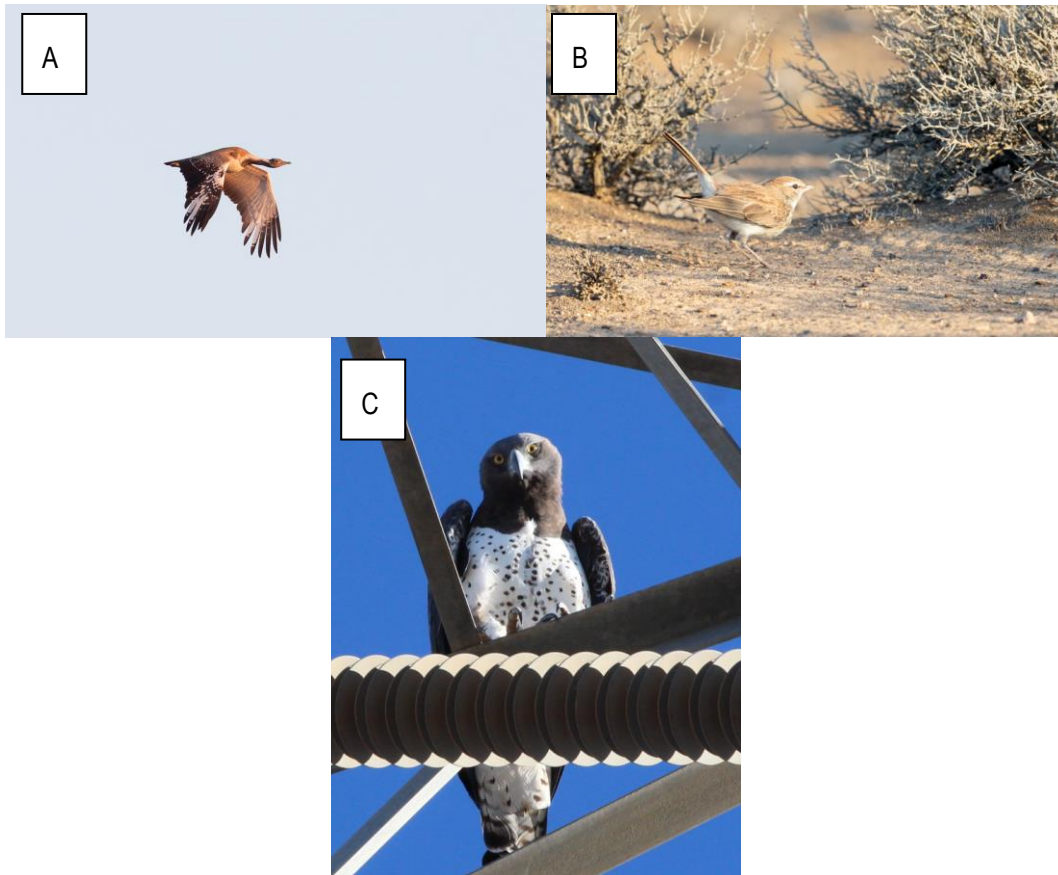


Figure 5-19: Avifauna SCC observed within the proposed Botterblom WEF PAOI<sup>5</sup>.

<sup>5</sup> A = Ludwig's Bustard *Neotis ludwigii*; B = Red Lark *Calendulauda burra*; C = Martial Eagle *Polemaetus bellicosus*

**Table 5-5: Summary of avifauna species of conservation concern of known distribution, previously recorded in or adjacent to the study area pentads.**

Species	Global Conservation Status <sup>6</sup>	National Conservation Status <sup>7</sup>	Preferred Habitat	Potential likelihood of occurrence on study area and potential risk posed from the WEF
<i>Ardeotis kori</i> (Kori Bustard)	Near Threatened	Near Threatened	Primary upland grassland, desert savanna and karoo with foraging and roosting particularly on rocky/hilly terrain.	<b>Confirmed:</b> Moderate densities throughout the region and PAOI but surprisingly low densities within the study area. The species is likely to be a breeding resident within or adjacent to the study area. A large bodied species, it is highly susceptible to WEF development activities.
<i>Spizocorys sclateri</i> (Sclater's lark)	Near Threatened	Near Threatened	Dry shrubland, karroid drainage lines and karoo shrubveld	<b>Confirmed:</b> High densities throughout the region but uncommon in the study area The species is likely to be a breeding resident within or adjacent to the study area. A localised low flying passerine, it is not highly susceptible to WEF development activities but is threatened by habitat loss
<i>Calendulauda burra</i> (Red lark)	Vulnerable	Vulnerable	Red dune open shrubland/ grassy duneveld	<b>Confirmed:</b> Low densities throughout the region but locally common in the study area The species is likely to be a breeding resident within or adjacent to the study area. A localised low flying passerine, it is susceptible to WEF development activities (high display flights) but is more threatened by habitat loss.
<i>Aquila verreauxii</i> (Verreaux's' Eagle)	-	Vulnerable	Mountainous areas or areas with prominent outcrops with a high prey base (e.g. hyrax)	Moderately Likely: Frequent foraging resident throughout the PAOI but far less frequent within the study areas due to the large distances to the mountainous preferred habitats and a general lack of localised abundant prey. Localised areas exhibiting high abundance of hyraxes and rock rabbits should be considered highly sensitive to the species. The species is susceptible to poisoning events and WEF facilities with a low risk from proposed activities.
<i>Polemaetus bellicosus</i> (Martial Eagle)	Endangered	Endangered	Open bushveld, desert savanna and karoo with adequate roosting and foraging potential.	<b>Confirmed:</b> A rare breeding resident and foraging visitor dependent on adequate food supply and roosts. At least one breeding pair nesting within the proposed WEF boundary. Typically, the species would exhibit a Low to Moderate risk to the proposed development activities although the presence of

<sup>6</sup> IUCN 2021

<sup>7</sup> Taylor et al. 2015

Species	Global Conservation Status <sup>6</sup>	National Conservation Status <sup>7</sup>	Preferred Habitat	Potential likelihood of occurrence on study area and potential risk posed from the WEF
<i>Rhinoptilus africanus</i> (Double-banded Courser)	Least Concern	Near Threatened	Flat, stony or gravelly, semi-desert terrains with firm, sandy soil and tufty grass or thorn scrub	a permanent nest site and foraging juveniles significantly increases the risk to local individuals. <b>Confirmed.</b> A fairly common breeding resident recorded in the current study. Not highly vulnerable to the proposed activities due to ground dwelling habitats. .
<i>Ciconia nigra</i> (Black Stork)	-	Vulnerable	Breeds on steep cliffs within mountain ranges; forages on ephemeral wetlands, pastures and agricultural fields. .	Unlikely: A highly irregular to rare foraging visitor dependent on the wetland systems located throughout the study area and potentially vulnerable to the proposed development activities. The proposed WEF is not situated adjacent to large tracts of the preferred habitat of the species.
<i>Falco biarmicus</i> (Lanner Falcon)	-	Vulnerable	Varied, but prefers to breed in mountainous areas.	<b>Confirmed:</b> A fairly common foraging migrant recorded in the current study and expected periodically to occur. Not highly vulnerable to the proposed activities.
<i>Neotis ludwigii</i> (Ludwig's Bustard)	Endangered	Endangered	Primary upland grassland, desert savanna and karoo with foraging and roosting particularly on rocky/hilly terrain.	<b>Confirmed:</b> High densities throughout the study areas. The species is likely to be a breeding resident within or adjacent to the study area. A large bodied species, it is highly susceptible to WEF development activities as shown by direct interactions with the existing Khobab turbines (although no mortalities have been recorded).
<i>Sagittarius serpentarius</i> (Secretarybird)	Vulnerable	Vulnerable	Prefers open grassland or lightly wooded habitat although forages extensively in open karroid savannah.	Moderate to Highly Likely: Regular low-density resident which is most likely of lower risk to the proposed development activities given ground foraging habitats. In addition, persistent long term regional drought may have significantly decimated local prey sources (especially snakes) thus further reducing the likelihood of persisting local populations of significant densities.
<i>Eupodotis vigorsii</i> (Karoo Korhaan)	Near threatened	Near threatened	Karroid habitats, large saline pans and shallow impoundments.	<b>Confirmed:</b> Common resident occurring near areas with drainage lines (including ephemeral) and open areas. Individually susceptible to WEF development activities but as a species is considered low risk.
<i>Afrotis afra</i> (Southern Black Korhaan)	Vulnerable	Vulnerable	Prefers open grassland, succulent and nama karoo as well as	<b>Confirmed:</b> Only two sightings within the PAOI as the study area overlaps with the far more common Northern Black Korhaan. Within the survey area regular breeding resident

Species	Global Conservation Status <sup>6</sup>	National Conservation Status <sup>7</sup>	Preferred Habitat	Potential likelihood of occurrence on study area and potential risk posed from the WEF
			cultivated fields and lightly wooded habitat although forages extensively in open karroid savannah associated with the study area.	which is most likely of moderate risk to the proposed development activities given the species proclivity to fly at lower heights within the rotor sweep zone.
<i>Falco naumanni</i> (Lesser Kestrel)	Near Threatened	Near Threatened	Widespread species prefers open grassland or lightly wooded habitat although forages extensively in open karroid savannah. Roosts collectively in locations with tall trees.	Highly Likely: Regular migrant of fluctuating seasonal density which is most likely of lower risk to the proposed development activities due to most pressures occurring with breeding grounds and migration routes.

### 5.8.3 Preconstruction Monitoring main results

Due to the ongoing preconstruction monitoring, the final data will be presented in the final EIA report.

#### Walked Transects counts

During the walked transects, the total number of individual birds (per species) were recorded regardless of if they are listed as priority or not. Due to the limited information currently, the Index of Kilometric Abundance (IKA = birds/km) was not calculated for each priority species. This information will be presented in the final EIA report. Notable Priority Species recorded included Ludwig’s Bustards that were often flushed from foraging positions as well as Northern Black Korhaans and Karoo Korhaans.

#### Drive Transect counts

The main focus of drive transects were the recording of large birds and raptors. These species were recorded during driven transects on the WEF site during two seasons. Raptors and korhaans and Red Lark were the most frequently recorded priority species. On some sample days, the observers returned at night and priority species were recorded (such as owls, coursers and thick knees). Once sampling for all four season has been completed a more accurate representation of avifauna species, especially large birds and raptors can be presented.

#### Vantage Points

Up to the current point of the one-year survey, the Vantage Point data collection appeared to provide the richest avifaunal observations. Priority species recorded during VP surveys were divided into three flight height categories (Low 0 to 50 m, Medium 50 to 150 m and High with all observations of birds flying more than 150 m).



Due to its abundance and conservation status, the Ludwig's Bustard is a priority species of concern since it may be prone to collision at certain times (e.g. when commuting between roosting and feeding sites, following rainfall events, invertebrate outbreaks (locusts) or commuting after farming activities which increase food availability). The species has been observed flying at rotor height multiple times during very brief survey periods. This included a (photographed) sighting of two individual bustards which were observed flying in a west to east directions directly between the existing turbines (Khubab WEF) within the rotor sweep area (Figure 5-20). In the remaining observations, Ludwig's Bustards were mostly observed close to drainage lines, adjacent to roadsides, in adjacent livestock fields and flying above linear structures such as the large railway line that bisects the PAOI. On multiple occasions, the observers' presence flushed some birds (presumably breeding pairs and/ or breeding pairs with a juvenile). Flights were most often generally very low (less than 50 m height) and short distanced although twice, individuals would take flight and leave the vicinity (+/- 2 km). In order to gain some understanding of which species are likely to be most at risk of collision, the collisions risk rating for each priority species recorded during VP watches will be presented in the final EIA report once data have been collected for all seasons.



**Figure 5-20: A photo showing Ludwig's Bustards flying at rotor sweep height through the existing Khobab WEF.**

### **Focal Sites**

The drainage line system outside the western boundary of the project study area contained a relatively high density (and higher diversity) of passerines, including Sclater's Lark. However, this species was not directly associated with the project development footprint but was associated with the PAOI and a static bat recorder point.

The existing power lines were also surveyed, and the only noticeable species of concern is the Martial Eagle and its nest (see section below). More information will be gathered during the ongoing surveys.

### Nest Survey

Nest sites were searched for during the initial surveys, and will continue to be actively searched for in the forthcoming surveys. Windmills, trees, pylons, bridges and masts represent potential roost and nesting sites for raptors, while water bodies are potential roost and nesting sites for multiple species. Including the active Martial Eagle nest (Figure 5-21 and Figure 5-22), breeding and foraging activity has been noted and will continue to be monitored during the forthcoming surveys. Ludwig's Bustard is considered a resident and to be breeding on site although no nests have been located. The winter and final spring survey will provide more data.



*Figure 5-21: Active Martial Eagle nest on the southern portion of the study area.*



*Figure 5-22: Bones and skulls of foraged species associated with the active Martial Eagle nest.*

#### 5.8.4 Bird sensitive features

It is important to note that currently, due to incomplete data collection, the sensitive areas that have been designated must be interpreted with caution. Each demarcated sensitive feature (of which more may be added) will still be evaluated for the degree of sensitivity based on the complete 12 month data set and presented in the final EIA report. Figure 5-23, which represent the preliminary sensitive features, needs to be carefully interpreted in the absence of a complete data set.

There is an important presence of a number of SCC in the study area, recorded regularly and widespread through the proposed WEF area. In addition, there are several raptors utilising the PAOI, some of them priority species and/or of conservation concern, such as the Martial Eagle, Lanner Falcon, Pale-chanting Goshawk and Black-winged Kite.

Areas of drainage lines and natural vegetation which are vital to maintaining populations of habitat obligate sensitive species (such as Sclaters' Lark and Red Lark) are associated to have a high probability of collision consistently throughout the year. Furthermore, natural drainage line vegetation represents an important habitat to maintain natural geohydrological processes of the PAOI. A 50 m buffer around these areas must be considered NO-GO where no turbines and associated infrastructure may be located. A 200 m buffer is also applied around seasonally inundated watercourses in the PAOI, as these features attract birds under certain conditions and could be the only locations where certain sensitive species such as the ducks, herons, storks and water birds are likely to occur. These areas must be avoided by the developer where no turbines and associated infrastructure may be located. Several of the proposed turbine positions and associated infrastructure coincide with areas currently demarcated as sensitive features within the prescribed buffers and consequently may have to be relocated outside of these sensitive areas. The layout will have to be carefully re-evaluated in order to mitigate against negative interaction with priority species such as Red Lark.

#### 5.8.5 Martial Eagle Nest Site

At this point in the survey, a preliminary buffer of 3 km is recommended as an exclusion area around the active Martial Eagle nest, which is to be confirmed after the completion of the 12 month pre-construction monitoring. There is currently no species-specific guideline for the Martial Eagle, and buffer areas around nest sites remains a scientifically contentious topic of discussion in the industry without rigorous scientific studies providing necessary guidance (for example, Murgatroyd, Bouten & Amar 2021). The only published recommended buffer to implement around raptor nests in South Africa is for the Verreaux's Eagle (Ralston-Paton, 2017), which dictates that a precautionary buffer of 3 km is recommended and may be reduced or increased based on the results of rigorous avifaunal surveys, but nest buffers should never be less than 1.5 km.

A recent paper from Murgatroyd, Bouten & Amar (2021) indicated that by using predictive models to account for habitat use instead of simple buffers around a nest, a greater area of land can be made available for wind energy development without increased mortality risk to raptors. Accordingly, this tool can be used to provide robust guidance on wind turbine placement in a way which minimises the conflict between raptor species and the development of wind energy facilities in South Africa. It must be noted that the study species for this research was Verreaux's Eagle which was tracked at only four locations (not including the current habitat or region), and accordingly the interpretation of the results needs to be considered as species- and site-specific, even though the same principle can be extrapolated to other raptor species in various regions. The study recommended that nest buffers should never be <3.7 km radius, but also indicated that additional site-specific specialist input or mitigation methods might allow a limited amount of development for high-risk developments. Based on the preliminary data collected

during the pre-construction monitoring (see above), the breeding pair of martial eagles do not appear to be foraging regularly over the proposed Botterblom WEF development area.

The current survey, in accordance with the accepted methods shows limited use of the proposed development footprint area by the two Martial Eagles. Only one individual was recorded at any one time, and always from VP4 and DT1 which were close to the nest site, and VP5 (control) which is located approximately 3.8 km southeast of the nest site. This could be due to there being very low densities of livestock and limited preferred prey on or immediately adjacent to the proposed development footprint area, which forces the eagles to hunt further away from the study area. However, the specialists agree that sporadic monitoring information, as has been collected to date, is not a definitive substitute for robust telemetry-based home range data. Therefore, the absence of observations of these eagles flying over the proposed development footprint area does not provide conclusive evidence that they do not utilise this area for foraging purposes.

Considering that only four collision-caused fatalities for Martial Eagles have occurred at 20 WEFs across South Africa between 2014 and 2018 (Perold *et al.*, 2020), coupled with the proposed development footprint not being within a core regional stronghold (Taylor *et al.* 2015), and the significance of the Martial Eagle nest being located in an unnatural situation (having nested on a pylon), the impact of the proposed development for the species may be classified as moderate to low significance. The presence of the eagles is a direct result of the existing and planned WEFs and solar PV facilities because they are nesting on artificial structures (transmission line pylon) specifically built for the transmission of electricity generated from these renewable energy projects (via the Helios substation). Sterilizing large sections of the proposed renewable energy developments due to the unnatural presence of these eagles is therefore not advisable, especially since the eagles may at any moment willingly decide to abandon or relocate their nest for natural reasons (e.g. low prey availability). As a result, it is strongly recommended that a Martial Eagle specialist (we propose Dr. Gareth Tate of the EWT) should be consulted to investigate the potential mitigation option of removing the Martial Eagle nest when no egg or fledgling is present so that the adults may disperse and rebuild a nest further away from the proposed Botterblom WEF and the other existing and planned WEFs in the immediate vicinity. Such a mitigation measure would need to ensure:

- appropriate dispersal of the parents away from the current and planned WEFs (not increased likelihood of flying into existing and proposed WEF space);
- prevention of re-nesting on the same or nearby electricity pylons of the Helios-Juno Line 1 transmission line.

Collision-caused fatalities of birds at wind power facilities create a 'green versus green' conflict between wildlife conservation and renewable energy. These fatalities can be mitigated through several interventions, including informed curtailment whereby turbines are slowed or stopped when birds are considered at increased risk of collision (McClure *et al.*, 2021). Automated monitoring systems (radar detection systems) could improve efficacy of informed curtailment, especially when considered in conjunction with other mitigation actions such as painting one turbine blade black (May *et al.*, 2020). McClure *et al.*, (2021) showed that automated curtailment of wind turbine operation substantially reduce (not fully eliminate) eagle fatalities. This technology therefore has the potential to significantly reduce the conflict between wind energy and raptor conservation.

Should automated monitoring systems not be feasible then the use of full time (shift work based) designated Martial Eagle observers can be considered which may serve to both ensure local job creation as well as supplement the above-mentioned mitigation measures while reducing the size of the nest buffer, should it not be possible to remove the nest. Permanent observers

can be assigned to both the nest site as well as the affected WEF area where Martial Eagle behaviour can be monitored and emergency actions (e.g., turbine shutdowns) can be initiated based upon the breach of pre-approved risk criteria.

The authors of this report therefore argue that should the eagle nest not be removable (pending input from a species-specialist) a precautionary 3 km buffer for this project would be sufficient, but only if the accompanied mitigation measures are implemented (this will be further expanded on in the EIA report).

The combined sensitivity for avifauna has been indicated in the map below (Figure 5-23). The buffer and sensitivity map will be finalised after the full 12 month pre-construction monitoring has been completed.

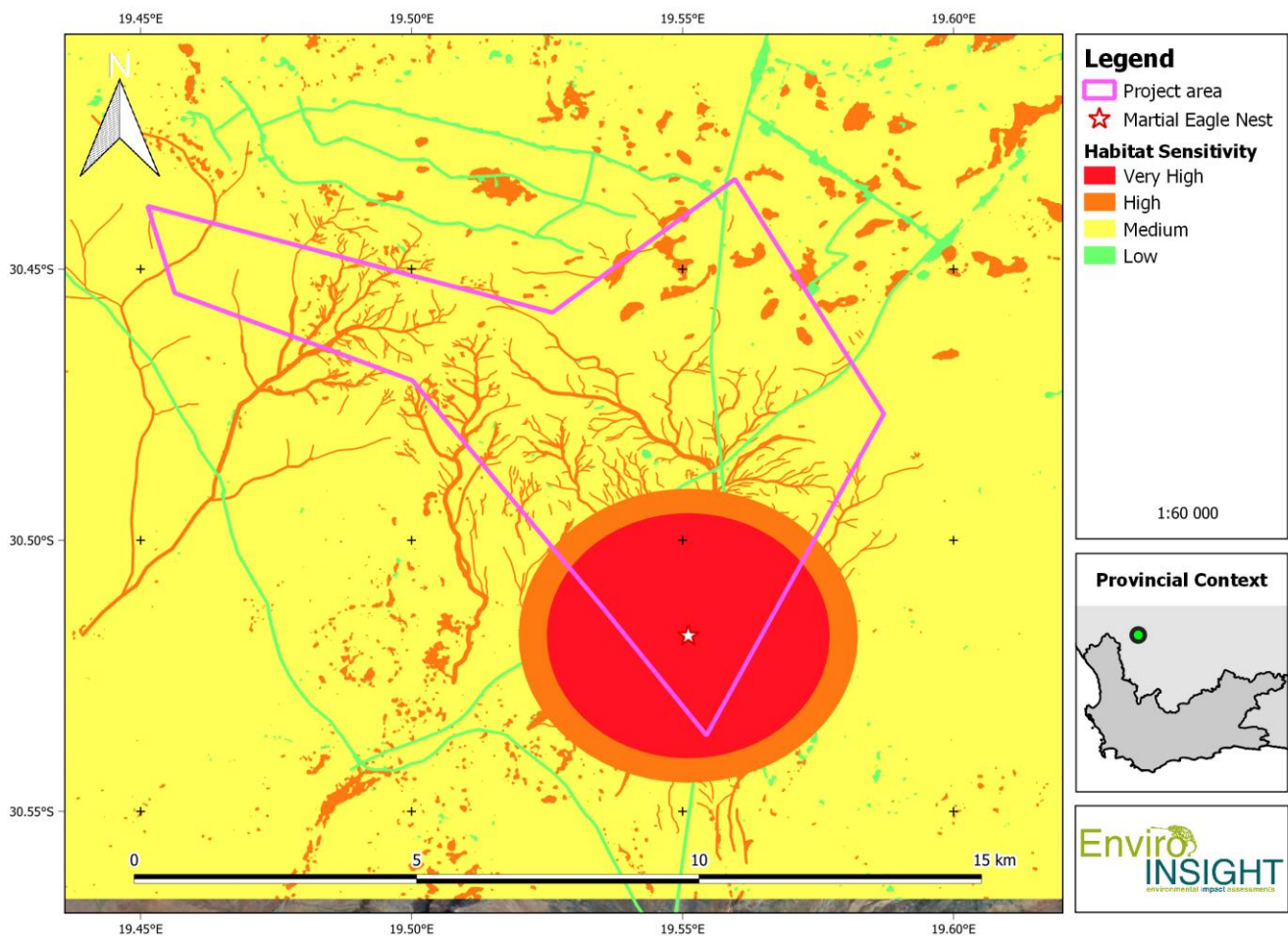


Figure 5-23: Preliminary avifaunal sensitive features.

## 5.9 BATS (WIND)

### 5.9.1 Affected Environment

The project area is located in the Nama Karoo Biome and is characterized by Bushmanland Basin shrubland. Based on the ecoregions delineated by Dinerstein *et al.* (2017), the entire project area is located in the Gariiep Karoo ecoregion, analogous to the Nama Karoo Shrublands ecoregion discussed in MacEwan *et al.* (2020). Despite the more recent and updated nature of the ecoregions delineation provided by Dinerstein *et al.* (2017), the SABPG (MacEwan *et al.*, 2020) preferentially use the ecoregions delineation of Olson *et al.* (2001), which indicates that a small portion in the southern part of the project area falls within the Succulent Karoo ecoregion. Given that there is no obvious difference in the recently delineated regional vegetation map and that our observations in the field also failed to detect any obvious vegetation differences in this southern portion, we preferentially apply the more recent and updated ecoregion delineation from Dinerstein *et al.* (2017) for this project area and therefore assess bat fatality risk for the whole project area according to the Nama Karoo ecoregion thresholds defined in Table 5 of the SABPG (MacEwan *et al.*, 2020).

The area is characterised by small dry river courses and drainage lines, with no permanent water and only seasonal (ephemeral) pans are present. The topography is relatively flat, with no steep rises. Average maximum temperature for the warmest month of the year (January) is ca. 30 °C and minimum for the same period 17 °C. Average maximum and minimum temperature during the coldest months is 15 °C and 2 °C respectively. The project area is located in a winter rainfall region with the wettest month being June and receives an average of 14.1 mm of rain per year.

### 5.9.2 Field surveys

#### 5.9.2.1 Site visits

Several site visits have been completed to date (Table 5-6) spanning spring to late summer. The data from the autumn and winter surveys will be included in the EIA report after the full 12 month pre-construction monitoring has taken place.

**Table 5-6: Summary of site visits and work conducted.**

Season and Dates	Methods	Weather conditions	Comments
Spring: September 2020	1-5 Scoping Phase	End of winter rain – vegetation sparse and plants starting to wilt.	The static bat detectors were deployed.
Early summer: November 2020	10-14 Walk, Drive	Dry and hot conditions. Vegetation minimal, bare landscape.	Transect were walked and driven and data retrieved from bat detectors
Summer: December 2020	9-11 Bat roosts	Dry and hot conditions. Vegetation minimal, bare landscape.	Roost inspection was done and data retrieved from bat detectors
Late summer: March 2021	15-17 Bat roosts	After good rains. Green vegetation with grass cover. Wetland pans filled with water.	Roost inspection was done and data retrieved from bat detectors

### 5.9.2.2 Walkover survey

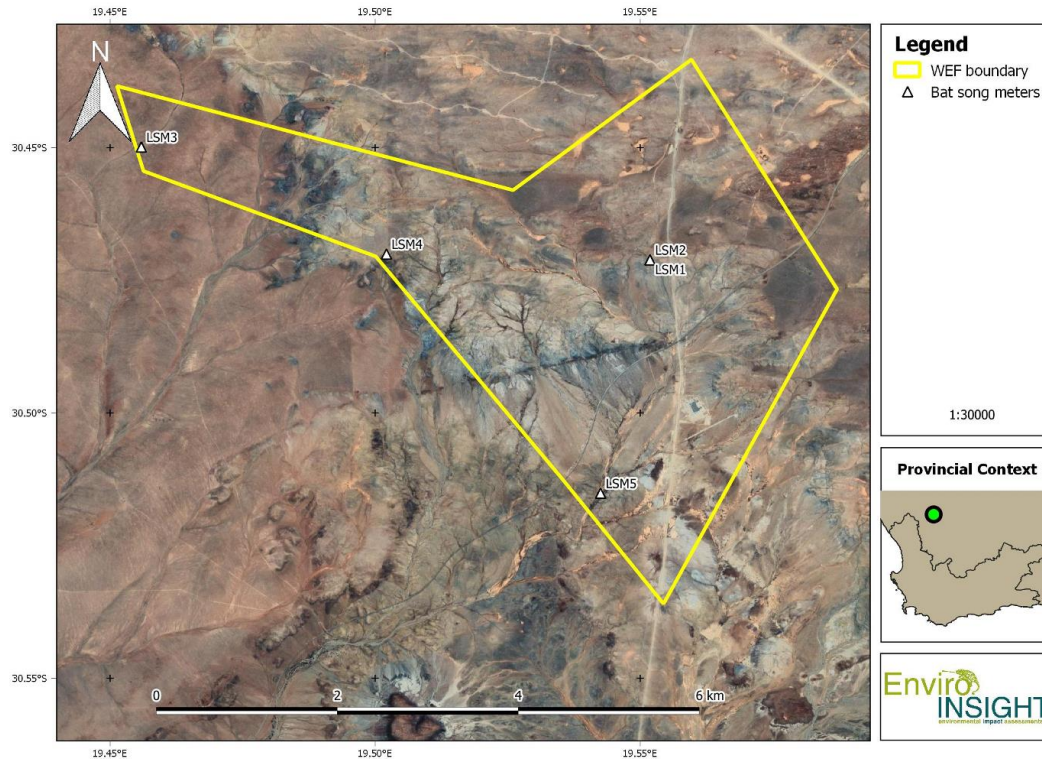
A survey was performed by walking and driving across the project area as a ground truthing exercise to identify suitable areas for placement of bat detectors, identify potential roosting sites and sensitive areas and evaluate the level of monitoring that is required. This was performed prior to the deployment of the bat detectors.

### 5.9.2.3 Passive song meters

Nightly recordings of bats from dusk to dawn were captured using the Wildlife Acoustics Song Meter SM4BAT FS Ultrasonic Recorders (hereafter referred to as “bat detectors”). A total of five bat detectors were deployed throughout the project area, spatially arranged to cover all major habitat types and/or important bat habitat features (Figure 5-24). As per the SABPG (MacEwan *et al.*, 2020), one bat detector must be deployed at a height of 7 - 10 m per 5 000 ha or for every significant biotope on the project AOI and one detector must be deployed at a height of 50 – 80 m per 10 000 ha for mast that are 80 m tall. If a mast is taller than 80 an additional bat detector must be deployed as close to the top of the mast as possible. This considered, four bat detectors were deployed at 7 m above ground level, whereas one was deployed at 50 m (Table 5-7). An additional recorder was placed at 100 m, but only started recording in March 2021 (the data for this is not presented in this report – refer to the limitations section above). All devices were scheduled to record from 30 min before sunset to 30 min after sunrise at the location of the bat detector. During this time, the device is ‘armed’ and will begin a recording if a ‘trigger’ is detected. A trigger is defined as a sound within the set frequency range (Default: >16 kHz) amplitude (Default: 12 dB) for a minimum duration (Default: 1.5 ms). The recording then continues for the duration of the Trigger Window (Default: 3 second) after the last Trigger, and then saves the recorded data. If there are constant Triggers, the recording will save and close after the maximum length of a recording file (Default: 00m:15s). The batteries for the bat detectors were exchanged approximately every month and at this time all data were copied from the SD card and backed up.

**Table 5-7: The details of the deployed bat detectors.**

Bat Detector ID	Microphone above ground	Height	Latitude (°)	Longitude (°)	Date deployed
LSM1	50 m		-30.471144	19.551831	04/09/2020
LSM2	7 m		-30.471144	19.551831	04/09/2020
LSM3	7 m		-30.449887	19.45587	04/09/2020
LSM4	7 m		-30.47005	19.502112	05/09/2020
LSM5	7 m		-30.515138	19.542507	04/09/2020
LSM6	100 m		-30.471144	19.551831	20/03/2021



**Figure 5-24: Passive bat song meter locations showing the setup and immediate surrounding habitat.**

### 5.9.2.4 Active transects

At the time of this report compilation, only summer transects had been performed, covering 4 consecutive nights. By the end of the 12-month period, a minimum of 8 nights of active sampling will be completed across all four seasons (2 nights per season). Initially, not all transects were driven for the 2.5 hours per night between dusk and 4 hours after dusk as per the SABPG (MacEwan *et al.*, 2020), but rather divided into smaller sections in order to cover more ground throughout the night. As such, more transects were driven and walked, and the total transect duration exceeded the minimum requirement of 5 h total survey duration over 2 nights as stipulated in MacEwan *et al.* (2020). Transects were only conducted under fair weather conditions (nights with rain or strong winds were avoided). Bats were recorded using a Song Meter SM4BAT FS Ultrasonic Recorder with the microphone held outside the vehicle while driving at a maximum of 35 km/h along the same transect routes between survey periods. All transects were tracked using a handheld GPS.

### 5.9.2.5 Bat roosts

Potential bat roosts, including buildings and other infrastructure, were visited and visually inspected during the day for signs of bats. No caves were found on the site, and none are expected within 20 km of the area due to the topography, but the railway cutting across the AOI can create potential artificial roosts. These were inspected for any signs of roosting bats, which included looking for faecal material and acoustic monitoring with a handheld bat detector.



### 5.9.3 Results

#### 5.9.3.1 Literature review

The ACR (2020) indicated that no bat species have previously been found within 100 km of the proposed site and as such no museum records have been collected for the area. The closest records are *Rhinolophus clivosus* (104 km from site) and *Laephotis capensis* (107 km from site). Based on Monadjem *et al.* (2020), the ACR (2020) and previous surveys conducted for WEFs in the area (Animalia 2011, Animalia 2017), 11 species could potentially occur in the AOI (Table 5-8), all of which are considered to be of Least Concern by the IUCN. Two of these, *Laephotis capensis* and *Tadarida aegyptiaca*, were confirmed on the Khobab WEF site (Animalia, 2011) that was constructed to the north of the Botterblom WEF project AOI, and as such it can be expected that these two species will be found during the current survey. During the survey for the proposed Kokerboom WEF (Animalia, 2017), *L. capensis*, *Miniopterus natalensis* and *T. aegyptiaca* were commonly found in the area. In addition, *Myotis tricolor* and *Eptesicus hottentotus* were detected, but in low numbers. Finally, no nationally recognized protected areas are found within 100 km of the Botterblom WEF project area.

**Table 5-8: Species of bats that could potentially occur on the project area.**

Species name	Common name	Conservation Status	Foraging habits	Risk of Impact <sup>8</sup>
<i>Laephotis capensis</i>	Cape serotine	Least concern	Clutter-edge	Low
<i>Laephotis namibensis</i> ,	Namibian long-eared bat	Least concern	Clutter-edge	Low
<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat	Least concern	Clutter	Low
<i>Rhinolophus capensis</i>	Cape horseshoe bat	Least concern	Clutter	Low
<i>Cistugo sebrae</i>		Least concern	Clutter-edge	Low
<i>Miniopterus natalensis</i>	Natal longfingered bat	Least concern	Clutter-edge	High
<i>Nycteris thebaica</i>	Egyptian slit-faced bat	Least concern	Clutter	Low
<i>Myotis tricolor</i>	Temminck's myotis	Least concern	Clutter-edge	Medium to high
<i>Eptesicus hottentotus</i>	Long-tailed serotine	Least concern	Clutter-edge	Medium
<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat	Least concern	Open-air	High
<i>Sauromys petrophilus</i>	Robert's flat-headed bat	Least concern	Open-air	High

#### 5.9.3.2 Acoustic Monitoring

Activity increased steadily after sunset and was highest between 21:00 and 3:00. Bat activity tends to be high in the period directly following sunset due to bats leaving their roosts, and the pattern observed here could suggest that bats do not roost on the project AOI but take some time to reach the area from roosts that are located further away. This is, however, currently only speculation based on overall activity observed and should not be considered conclusive. Bat activity was in general higher during November. This could indicate that bats move through the area during that time, using the eastern section on the

<sup>8</sup> MacEwan *et al.*, 2020

proposed area as a fly through. Mortality of bats at WEF have also been correlated with insects migrating through an area at height (Rydell *et al.* 2010), and this could be a possibility for the peak in activity observed during November. Seasonal activity was higher during spring than summer suggesting that bats move out of the area, or forage elsewhere, during the dry summer months, and that there are no breeding colonies present on the project area, but additional data from the autumn and winter months will help test this hypothesis. Based on the SABPG (MacEwan *et al.*, 2020) for the Nama Karoo Shrublands ecoregion, analogous to the Gariep Karoo ecoregion as defined by Dinerstein *et al.* (2017), a median of between 0.18 and 1.01 bat passes per hour classifies as a Medium Risk for fatalities and above 1.01 as a High Risk.

Only four bat species were recorded by the bat detectors during the Sep 2020 – Jan 2021 survey period, all of which are listed as Least Concern on the IUCN Red Data List, are not regarded as ToPS species, are not CITES listed and are not endemic to South Africa (IUCN, 2020). *Tadarida aegyptiaca* was the most common bat species recorded, followed by *S. petrophilus*. Both are open-air foragers, and this habitat structure thus provides excellent foraging opportunities for these species. *Eptesicus hottentotus* and *L. namibensis* are clutter-edge foragers, and the lack of a more complex vegetation structure does not suite their foraging requirements. As such it is expected that their presence in the project area will be limited. All four of these species will roost in rock crevices and as such it is expected that they face similar restrictions in terms of roosting habitat available.

Monthly activity patterns show activity levels of *T. aegyptiaca* increasing from September with a peak during November. Activity for *S. petrophilus* is relatively constant across all months. Before definite conclusions can be drawn from these data, a full years' worth of data will need to be acquired to further investigate variation in activity which could be indicative of migratory patterns, but the current data would suggest that *T. aegyptiaca* move through the area during November as part of a migratory route, perhaps using it as a resting stop. Seasonal activity of both *T. aegyptiaca* and *S. petrophilus* is higher during spring than summer.

### 5.9.3.3 Roosting sites

Large structures that have thus far been investigated for large or medium roosts on or near the project area showed no indication of bats present. In addition, the surrounding topography does not lend itself to cave structures and no mention was made of large roosts or caves in any previous surveys. Nine potential roost sites were investigated for the presence of bats, and only one bat was confirmed during day inspections.

A single *N. thebaica* was found near a homestead approximately 15 km from the study site. This species was never recorded by the bat detectors, but since they are known as “whispering bats” with low intensity calls this is not surprising (Monadjem *et al.*, 2020). An attempt will be made to investigate the four potential roost sites located in the AOI at dusk during future site visits to determine acoustically if bats are present. Considering the species found during passive monitoring, special attention will be given to the railway cut-in, the abandoned farmhouse and the rocky outcrop as these are deemed to be the best potential roosting sites for *T. aegyptiaca* and *S. petrophilus*.



*Figure 5-25: Photographs of the railway road underpass and features relevant for potential bat roosts.*



*Figure 5-26: Photographs of the railway in-cut banks showing crevices relevant for potential bat roosts.*

#### 5.9.4 Bat sensitive features

Currently the sensitive areas are only marked without any classification being applied to it. Therefore, no Very High or High sensitive features have been identified as yet. Accordingly, each sensitive feature will still be evaluated based on the complete 12-month data set. Figure 5-27, which represents the preliminary sensitive features identified needs to be carefully interpreted in the absence of a complete data set.

Certain habitats are expected to have a higher abundance of bats due to their potential for roosting, foraging and migration routes. The area in the east had much higher bat activity than the bat detectors placed in the western section of the project area. As per the SABPG (McEwan *et al.*, 2020) no turbines or any other structure, including infrastructure and major roads, may thus be constructed 200 m around bat sensitive areas. Numerous potential bat roosts and the railway track are located in the eastern section, and as such it is recommended that a 200 m buffer be applied around these potential roosts until it can be confirmed that they are not used as roosting sites by bats. Currently a 200 m buffer has been implemented around all water courses which may be altered once the full 12-month survey has been completed. The largest of these water courses will, however, have a 200 m buffer which will not be altered. This is due to high bat activity in the area and the presence of trees. The area in the west has relatively little bat activity, and as such the buffers in this area might be removed depending on bat activity during the autumn and winter months. The major water courses, although mostly dry and episodic, nevertheless provide a seemingly greater density of vegetation that remains green for longer than the vegetation of the surrounding plains and therefore, are likely of importance for bats as a foraging resource because vegetation is required for their insect prey to feed on. During the active monitoring, bats were only detected near the railway bridge further confirming this area as sensitive. There is a greater coverage of photosynthetic plants in the western part of the project area during the dry season based on Normalised Difference Vegetation Index (NDVI) mapping (Figure 5-28). This indicates that bat activity does not correspond directly with the presence of any photosynthetic vegetation and that it is likely the specific type of vegetation and its structure that is of relevance to bats. However, a more complete assessment will be made based on a full years' data.

Several of the proposed turbine positions coincide with areas currently classified as sensitive features and consequently may have to be relocated outside of these sensitive areas to minimise potential negative impacts.

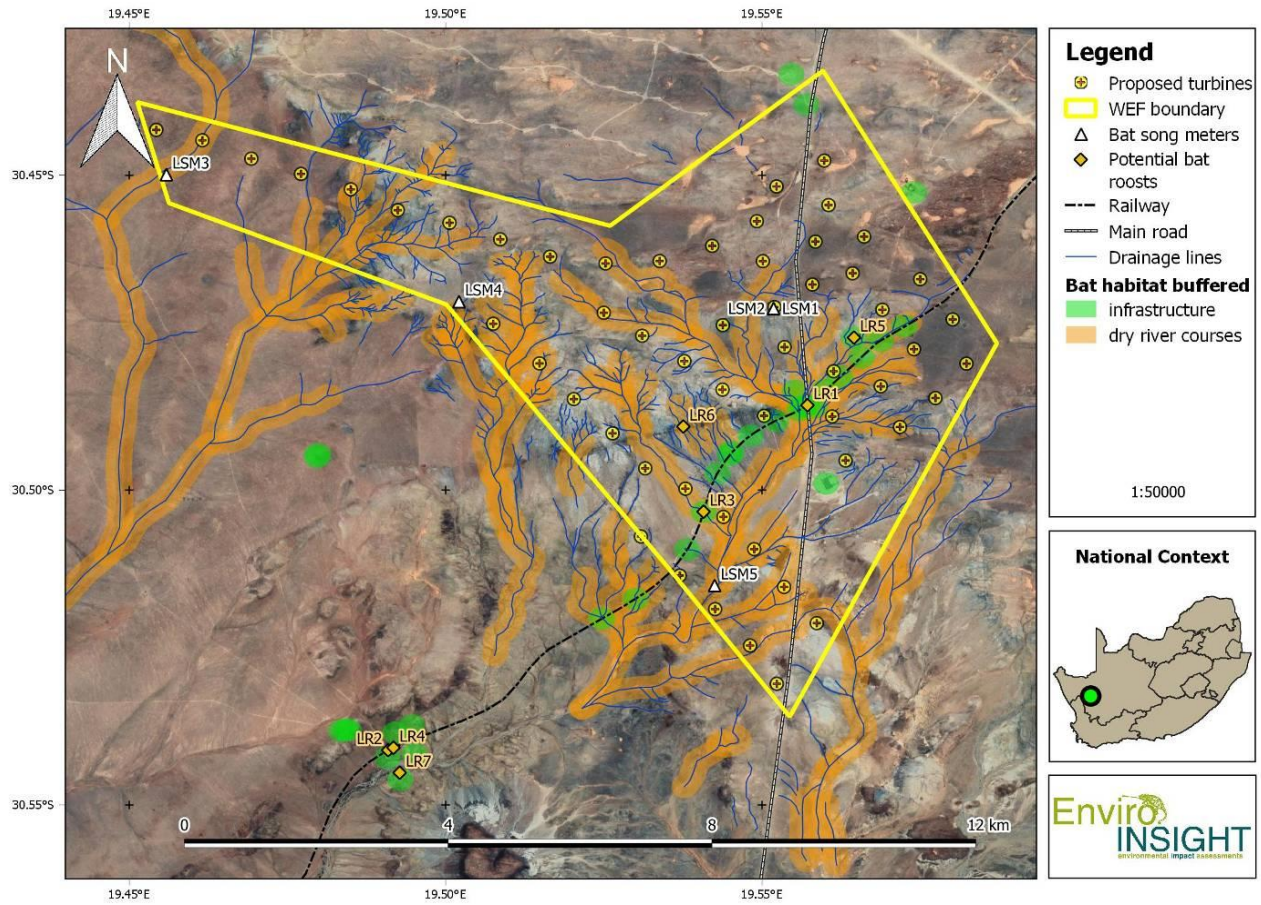


Figure 5-27: Preliminary sensitive bat features within the study area showing the appropriate buffers.

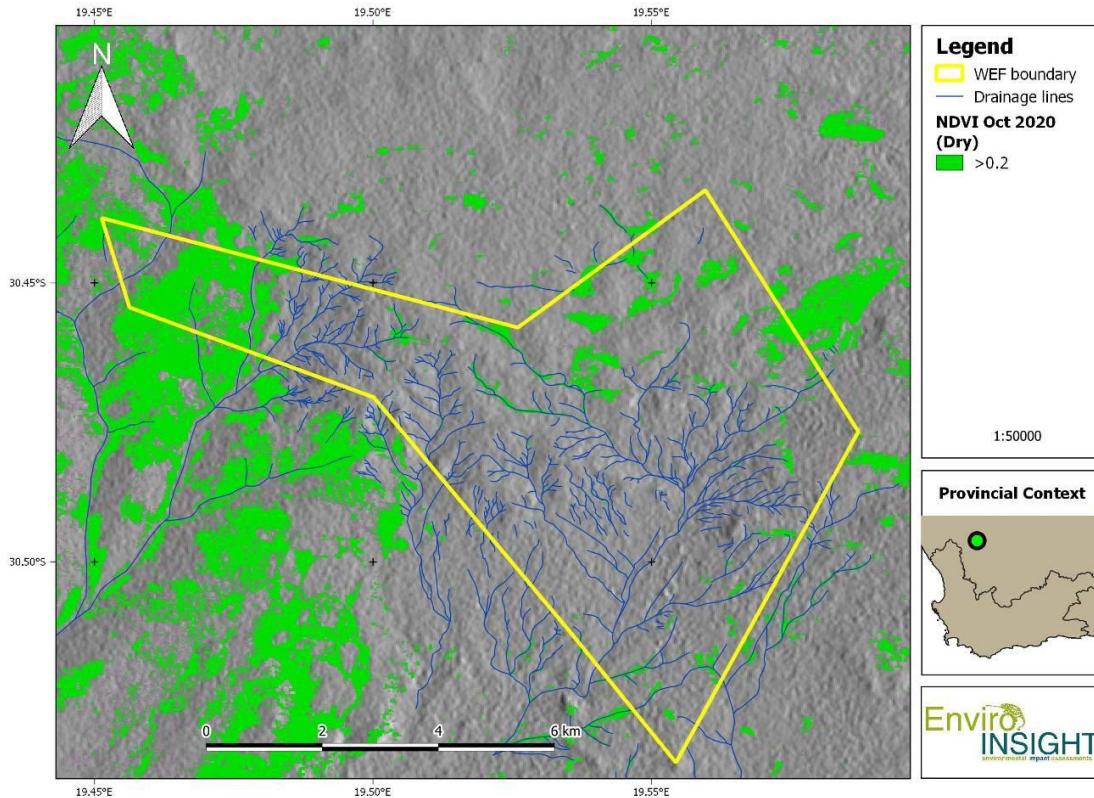


Figure 5-28: Map indicating Normalised Difference Vegetation Index > 0.2 of the area.

## 5.9.5 Potential Impacts

### Impacts identified

#### Construction Phase:

- **Habitat destruction:** access roads and turbine or infrastructure construction may necessitate the removal of foraging habitat and sensitive bat features, such as migratory routes
- **Destruction or disturbance of bat roosts:** access roads and turbine or infrastructure construction may necessitate the removal or disturbance of bat roosts.

#### Operational Phase:

- **Bat mortality:** physical bat strikes and barometric trauma caused by spinning blades of the turbines during the operational phase.
- **Artificial lighting:** Artificial lights can have a negative effect on bat behaviour by affecting flight paths used. On the other hand, bats could be attracted to lights due to higher insect abundance and be at higher risk of collision mortality.
- **Flight/migratory paths:** Turbines placed on pathways used for migration can have severe effects on bats moving through the area during times when bats move to winter/summer roosts.

### ***Proposed Mitigation Measures***

**Habitat destruction:** Apply necessary buffers for roost sites and sensitive bat features, avoiding the construction of turbines and access roads in these areas. Roads must follow existing farm roads as far as possible.

**Bat mortality:** Avoid placement of turbines near sensitive bat features and roosts, adaptive mitigation measures according to post-construction monitoring results (counted strikes) informed by environmental correlates of bat activity.

**Bat collisions:** Increase turbine cut in speed as this has been shown to reduce collisions.

**Avoidance:** It is recommended that NO development (including the full rotor swept zone of wind turbines) takes place in BOTH Very High and High bat sensitivity areas. Take note that these areas still need to be defined and will be shown in the final EIA report. Avoid impacts to natural and artificial wetlands and water bodies by implementing the appropriate buffer areas where no development may take place.

**Artificial lighting:** With the exception of compulsory civil aviation lighting, minimise artificial lighting at night, especially high-intensity lighting, steady-burning, or bright lights such as sodium vapour, quartz, halogen, or other bright spotlights at sub-station, offices and turbines.

**Flight/migratory paths:** Cut in speeds needs to be increased and possible curtailment during times when bats migrate.

### **5.9.6 Discussion and Conclusion**

A total of five species were detected on the project AOI namely: *T. aegyptiaca*, *A. petrophilus*, *E. hottentotus*, *L. namibensis* and *L. capensis*. Based on the South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities (MacEwan *et al.*, 2020) an hourly median of under 0.18 bat passes on the bat detectors placed at ground level is regarded as a Low Fatality Risk and between 0.18 and 1.01 is Medium Risk for the Nama Karoo Shrublands ecoregion. The median bat passes/hour recorded at ground level for LSM 2, 3 and 4 during the current survey was 0.30, qualifying as a Medium Risk for bat mortalities. The median bat passes/hour recorded at 50 m (LSM1) was 0.70, and this potentially indicates a High Risk (> 0.42). However, the peak in activity observed during November influenced the observed data for the entire period, and when the data is considered without this peak the risk is reduced. The completed data set after 12 months will reveal whether there is in fact a high risk of bat collisions across the entire period or if this is only for specific months, but if the risk is only high during specific season's mitigation measures can be put in place to reduce this risk. In addition, a bat detector has been placed at 100 m during March 2021. Comparisons between the bat detector at 50 m and the one at 100 m will indicate if activity is indeed high within the rotor sweep zone.

Upon completion of the bat monitoring and subsequent updating of the sensitive areas map, the construction layout of the wind turbines and additional infrastructure can commence to avoid all sensitive areas. Currently, the predicted sensitive areas are around the dry riverbeds in the eastern part of the site, but a more comprehensive data set which will be obtained during the upcoming surveys, will provide a better indication of the sensitive areas.

From the available data collected, the construction of a WEF on the proposed AOI will have a Medium-High Risk of impacting the bat population in the area before mitigation measures have been put in place, but this statement is currently only valid for the spring and summer months. Currently, after mitigation measures have been followed this risk will be reduced to Medium.

This will be further investigated and discussed in the EIA report. The bat detector placed at 100 m will provide data to make a more informed recommendation and determine whether bat activity is in fact high in the rotor sweep zone. Currently it is suggested that mitigation measures be implemented during the spring and summer months considering the activity levels during this period. These mitigation measures would include a higher cut-in speed as this has been shown to significantly reduce bat mortalities (Arnett *et al.*, 2009) or curtailment during peak activity periods

## 5.10 AQUATIC BIODIVERSITY

A total of five riparian networks were delineated within the study area and within 500m from the study area as well as sections further downstream of the study area. All five riparian networks feed into the Leeuberg and Klein-Rooiberg Rivers which joins the Krom River downstream. In addition there were several non-FEPA wetlands indicated on the NFEPA database that was investigated. Only the terrain unit indicator was confirmed for the indicated NFEPA database depression wetlands. None of the other three wetland indicators were present. However, these depressions do hold water for a few days a year and could act as potential temporary habitat for various faunal species, however, water is likely not retained for a long enough period for redox morphology to develop, thus they are not likely wetlands. Following a cautionary approach, these features are termed 'riparian/ephemeral depressions', with some of the depressions being isolated while a cluster of depressions are linked via riparian channels. Further infield research is necessary to establish whether these features should indeed be classified as watercourses and thus have regulatory standing. For now, a cautionary approach stands in order to facilitate an environmentally friendly and sustainable planning process. The same cautionary and conservative approach was taken where there were doubt between differentiating between A section and B section channels, with A section channels likely included in the current delineation, especially on the highest lying areas where channels often do not carry base flow.

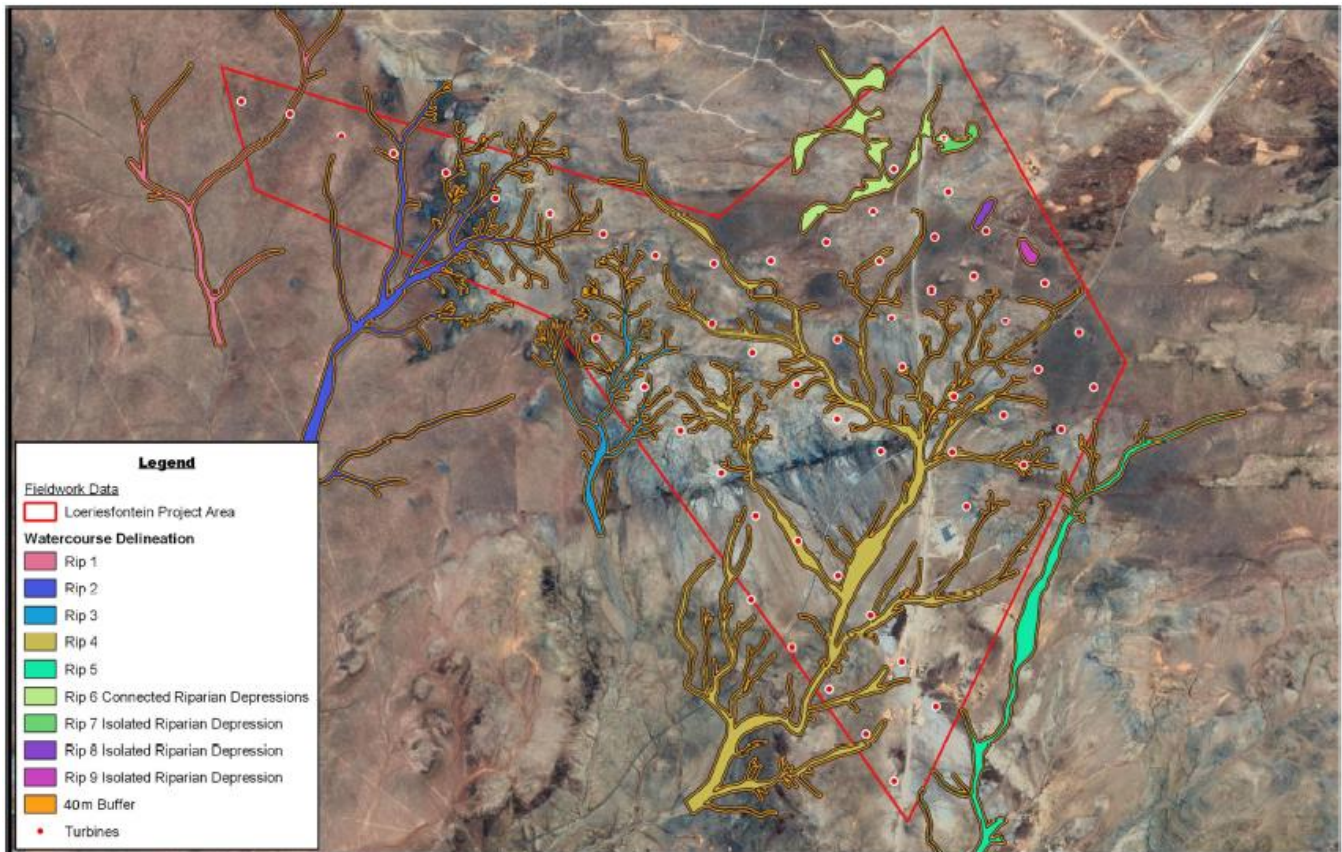
Findings of the VEGRAI vegetation assessment conducted on riparian units identified within the study area indicated that riparian habitat associated with the study area were regarded as being in a largely natural state (i.e. Ecological Category B). There are a few small areas that has been highly impacted through grazing practices (e.g. artificial waterholes, overnight camps etc), but collectively these heavily impacted zones form a very small percentage of the total riparian habitat.

In terms of ecological importance and sensitivity, riparian habitat (Riparian 1 to Riparian 9) within the study area was designated as sensitive as a result of the ecological and functional values attributed to riparian areas in general, legal regulations and requirements as well as the supporting ecological services afforded to the downstream ecosystems.

Determination of the preliminary buffer requirements for riparian features associated with the proposed study area followed the approach of Macfarlane & Bredin (2016), whereby the preliminary required buffers were developed based on various factors, including assumed agricultural impacts, slope, annual precipitation, rainfall intensity, channel width, catchment to wetland ratio, etc. Accordingly, preliminary buffer requirements for the identified watercourse were determined to be 40m from the edge of the delineated riparian areas. Further field work with regards to separating less sensitive A section channels from B section riparian channels will likely lead to reduced buffer distances and or not be applicable in some instances.

The proposed preliminary lay-out of wind turbines along with the watercourses and associated 40m freshwater ecosystem buffer is displayed in Figure 5-29.





**Figure 5-29: Preliminary turbine positions in relation to potential watercourse sensitivities and 40m buffer.**

Preliminary impact considerations identified destruction of water courses and associated habitat, surface water pollution including sedimentation as well as increased erosion, loss of wetland functionality and decreased downstream water quality as the major potential impacts during the construction and operational phase. Several general and specific mitigation measures were proposed in order to reduce negative impacts and incorporate some potentially positive impacts from the proposed development. Some of the most pertinent recommendations include:

- The layout should be adapted to ensure that wind turbines are not located within riparian habitat or associated buffers.
- It is essential that the road and other linear networks (cables) follow contour and lowest gradients as far as possible. Appropriate stormwater design for the road network is essential to prevent roads from serving as concentrated conduits for water run-off, significantly increasing erosion potential and sediment transport capacity. Water diversions along the road should be placed at regular intervals in order to divert water back into the natural veld on the downstream side of the road. This diverted water should be released in a diffuse manner on contour, e.g. appropriately designed swale.
- Access roads should preferably be dirt roads on contour. It is essential to choose appropriate water crossing for the road network in order to reduce potential negative impacts. Crossing points should preferably utilise watercourse sections which already contain exposed bedrock and has a low gradient in that particular section of the watercourse. These are ideal natural crossing points which need little intervention so as to ensure that historic stormwater run-off regimes are not altered. Where necessitated crossings should be simple low water bridges that do not interrupt surface

or subsurface flows. Concentration of water flow must be avoided. Where water is concentrated it needs to be diffusely released through appropriate diffuse release infrastructure placed on contour and or cutting bedrock to contour, especially on the downstream side.

- Watercourse crossings should be aligned perpendicular to the natural flow regime and on contour in order to prevent flow concentration and associated negative impacts.
- It is recommended that the road lay-out and all final positions of watercourse crossings be appropriately “fine tuned” through field verification in the impact assessment phase in order to minimise potential impacts and reduce road construction cost.

### 5.10.1 Conclusion

A total of five riparian networks were delineated within the study area and within 500m from the study area as well as sections further downstream of the study area. All five riparian networks feed into the Leeuberg and Klein-Rooiberg Rivers which joins the Krom River downstream. In addition there were several non-FEPA wetlands indicated on the NFEPA database that was investigated. Only the terrain unit indicator was confirmed for the indicated NFEPA database depression wetlands. None of the other three wetland indicators were present. However, these depressions do hold water for a few days a year and could act as potential temporary habitat for various faunal species, however, water is likely not retained for a long enough period for redox morphology to develop, thus they are not likely wetlands. Following a cautionary approach, these features are termed ‘riparian/ephemeral depressions’, with some of the depressions being isolated while a cluster of depressions are linked via riparian channels. Further infield research is necessary to establish whether these features should indeed be classified as watercourses and thus have regulatory standing. For now, a cautionary approach stands in order to facilitate an environmentally friendly and sustainable planning process. The same cautionary and conservative approach was taken where there were doubt between differentiating between A section and B section channels, with A section channels likely included in the current delineation, especially on the highest lying areas where channels often do not carry baseflow.

In terms of ecological importance and sensitivity, riparian habitat (Riparian 1 to Riparian 9) within the study area was designated as sensitive as a result of the ecological and functional values attributed to riparian areas in general, legal regulations and requirements as well as the supporting ecological services afforded to the downstream ecosystems.

Considering the type of development proposed and assuming that the necessary mitigation measures are appropriately designed and applied, the development is not likely to impact on the FEPA catchment classification associate with the study area.

### 5.11 AGRICULTURAL POTENTIAL

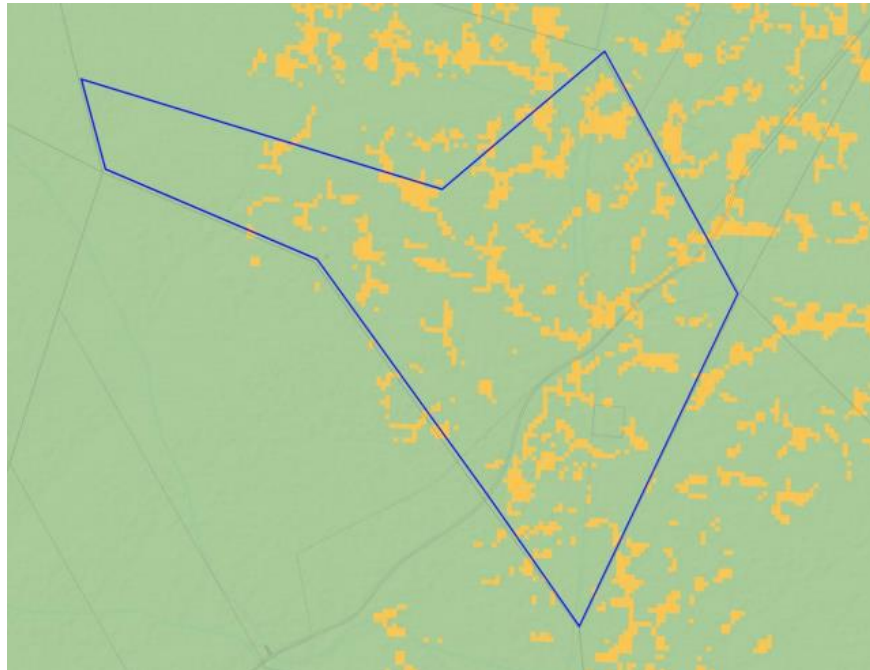
The Agricultural Compliance Statement was conducted by Johann Lanz (the Compliance Statement is included in **Appendix E5**). The baseline in perspective to agricultural potential is discussed and presented below.

### 5.11.1 Agricultural Potential

The agricultural potential for the proposed project area is **low**. This is not only due to the predominantly rainfall constraints, but also due to the soil constraints. The terrain is unsuitable for cultivation and the opportunity for grazing is very limited for livestock. Currently, the land is not being utilised for livestock grazing.

### 5.11.2 Agricultural Sensitivity

In terms of sensitivity, the land is regarded as **low and medium**. During the site assessment there were three agricultural impacts identified that might have a potential negative impact. However, none of the impacts are of high significance. These include loss of agricultural land use, land degradation and dust generation impact. The one positive impact that was identified is the increase of financial security. Figure 5-30 indicates the proposed development sight overlaid by the agricultural potential as per the Screening Tool, green = Low and yellow = Medium.



*Figure 5-30: Agricultural Potential sensitivity (green = Low and yellow = Medium) as per the Screening Tool.*

### 5.11.3 Mitigation Measures

The implementation of an effective stormwater system is recommended to protect the agricultural production capability of the study area. If this is implemented, the proposed development can proceed. This statement is supported not only by the fact that the land has a very low agricultural potential but also because the agricultural land loss is within the development limits and the proposed development poses a low risk in terms of soil degradation.

### 5.11.4 Conclusion

The conclusion for this assessment from an agricultural potential point of view is that the development should be approved and that there are no sensitivities of high significance.

### 5.12 NOISE

The Noise Compliance Statement was conducted by Enviro Acoustic Research (EARES) (the Compliance Statement is included in **Appendix E6**). Using the questionnaire as per the South African National Standards (SANS) 10328:2008, the conclusion of whether the proposed development could have noise implications and sensitivities, could be determined. All question as per the questionnaire were negative (not applicable) and therefore it is unlikely that the proposed development will have any noise disturbance. As per the recommendations of SANS 10328:2008, a scoping investigation and noise impact assessment will therefore not be required.

#### 5.12.1 Noise Sensitivity

As indicated in the figure below (Figure 5-31), the closest wind turbines would be over 2 km away from any Noise-Sensitive Development (NSD). No further Scoping or other acoustical studies is therefore required due to the proposed WEF having a low potential for noise impact.

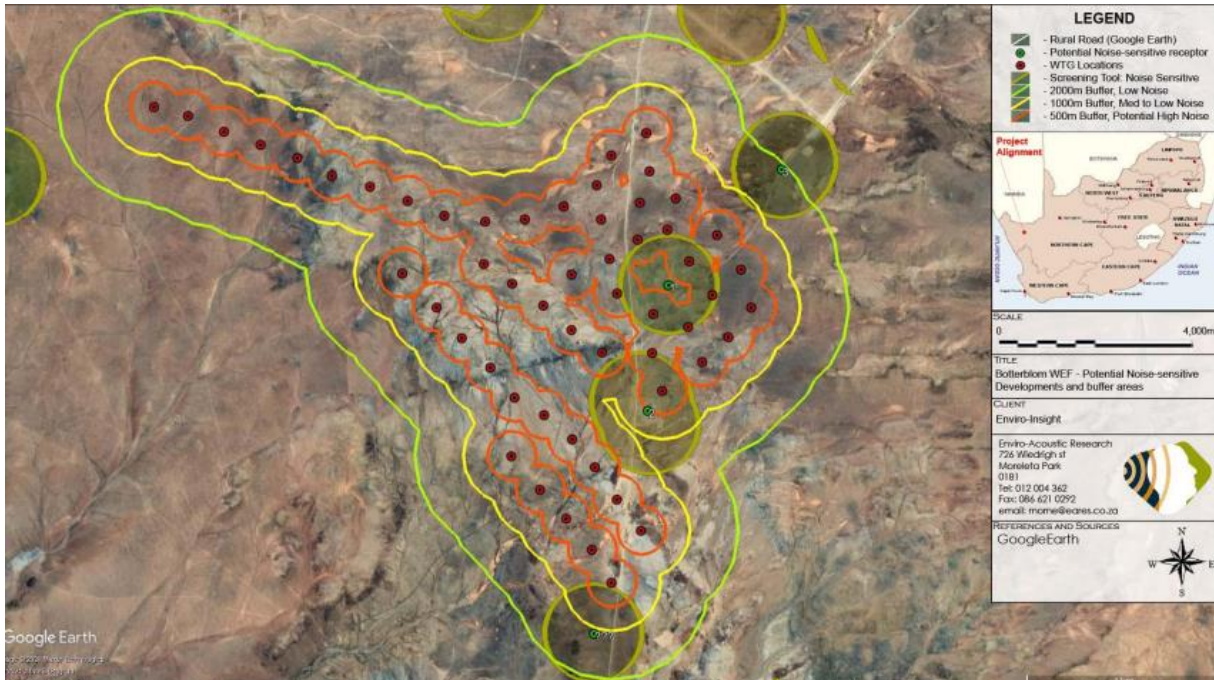


Figure 5-31: Potential Noise Sensitive Areas and identified receptors.

### 5.12.2 Mitigation measures

In terms of the noise impact or any additional noise measurements, there are no specific mitigation measures recommended and no additional conditions needed for including in the EMP.

### 5.12.3 Conclusion

In conclusion, it is recommended that the proposed development (Botterblom WEF) should be approved as it poses no sensitivities from a noise impact perspective.

## 5.13 VISUAL, LANDSCAPE AND FLICKER

The Visual Impact Assessment was conducted by Lourens du Plessis from LOGIS (the report is included in **Appendix E7**). Figure 5-32 indicates the areas around the proposed development from which a several number of wind turbines could potentially be visible.



*Figure 5-32: Representation of a wind turbine from a certain distance radius (1km, 2km, 5km and 10km) as per the Visual Impact Assessment Report.*

### 5.13.1 Visual Impact Results

As per the visual assessment the following is noticeable as per the indicated distances below:

#### 0 - 5km

The potential visual exposure will have a large central area within a radius of 5km of the proposed development. This is due to the wind turbines being a very tall structure and of the type of topography. The central area includes the following, the Khobab WEF, the largest part of the Loeriesfontein WEF and a 21.5km section of the Loeriesfontein secondary road.

The residents situated within 5km of the proposed WEF that might be exposed to the proposed wind turbine structures include the following:

- Kareedoorpan (Loeriesfontein WEF)
- Sous se Plaat (Khobab WEF)
- Sous (proposed Botterblom WEF)
- Narosies

#### **5 – 10km**

The exposure in terms of visual will remain high within this distance due to the type of topography found in the area. The residents situated within 5 - 10km of the proposed WEF that might be exposed to the proposed wind turbine structures include Bloupan, Brakpan, Klein Rooiberg and Raskraal.

#### **10 – 20km**

The visual exposure will be somewhat reduced within the radius distance, especially towards the west of the proposed project area. A number of settlements and residents, as well as secondary road sections are found within the distance which includes the following:

- Soutkonnas
- Bitterputs
- Goedom
- Struiskom
- Springboktand Tweelingpompe
- Bitter Kamas
- Hefnaar
- Soutpansfontein
- Stinkputs Noord
- Kluitjieskraal
- Stinkputs Suid

#### **> 20km**

Visual exposure in a radius of 20km and above is reduced significantly, especially southwest of the proposed development area, along the Krom River valley. It is expected that the turbine structures may be visible from the following residents and sections of secondary road, Konnas, Stootvleippan, Loerkop and Nelswerwe.

### 5.13.2 Anticipated issues as per the Visual Impact Assessment Report

The issues listed below may potentially contribute to a significant visual impact from a local and/or regional scale. These issues need to be assessed thoroughly during the EIA phase of the project.

- The visibility of the facility from, and potential visual impact on observers travelling along the secondary (local) roads within the study area.
- The visibility of the facility from, and potential visual impact on farm settlements and homesteads (rural residences) within the study area.
- The potential visual impact of the facility on the visual character and sense of place of the region, with specific reference to the vast landscape, open plains, and the scenic mountains (Klein and Groot Rooiberge).
- The potential visual impact of the facility on tourist routes or tourist destinations (e.g., tourist facilities within the study area) if applicable.
- The potential visual impact of the construction of ancillary infrastructure (i.e., internal access roads, buildings, BESS (if applicable), etc.) on observers in close proximity to the facility.
- The visual absorption capacity of the natural vegetation (if applicable).
- Potential cumulative visual impacts (or consolidation of visual impacts) with specific reference to the construction of the WEF adjacent to the operational Khobab and Loeriesfontein WEFs and other authorised renewable energy applications in the study area
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing within close proximity of the facility.
- The potential visual impact of shadow flicker.
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

### 5.13.3 Potential primary Impacts

<b>Impact</b>			
Visual impact of the facility on observers in close proximity to the proposed Wind Energy Facility infrastructure and activities.			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>No-Go Areas</b>
The viewing of the Wind Energy Facility infrastructure and activities	The potential negative experience of viewing the infrastructure and activities within a predominantly rural and natural setting	Primarily observers situated within a 5 - 10km (but potentially up to 20km) radius of the facility	N.A.
<b>Description of expected significance of impact</b>			

Extent: Local and/or regional Duration: Long term Magnitude: High to very high Probability: Probable Significance: High	Status (positive, neutral, or negative): Negative Reversibility: Recoverable Irreplaceable loss of resources: No Can impacts be mitigated: Yes
<p><b>Gaps in knowledge &amp; recommendations for further study</b></p> <p>A finalised layout of the Wind Energy Facility and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of the proposed structures and ancillary equipment.</p> <p>Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:</p> <ul style="list-style-type: none"> <li>• Visual exposure</li> <li>• Visual distance/observer proximity to the structures/activities</li> <li>• Viewer incidence/viewer perception (identify potentially affected sensitive visual receptors)</li> <li>• Determine the visual absorption capacity of the environment surrounding the infrastructure and activities</li> <li>• Determine potential shadow flicker impacts</li> </ul> <p><b>Additional activities:</b></p> <ul style="list-style-type: none"> <li>• Identify potential cumulative visual impacts</li> <li>• Undertake a site visit</li> <li>• Recommend mitigation measures and/or infrastructure placement alternatives</li> </ul>	

### 5.13.4 Conclusion

As per the result from the visual impact assessment report, the structure would be easily visible to observers due to its high visual prominence, especially within a radius of 5-10km of the proposed WEF, which will potentially result in a **high visual impact**.

### 5.14 HERITAGE

The Visual Impact Assessment was conducted by Jaco van der Walt from HCAC (the report is included in **Appendix E8**).

#### 5.14.1 Desktop findings

In previous studies done in the area several heritage sites were recorded, mostly related to the Stone Age (Late Stone Age sites and Middle Stone Age background scatter). These sites are marked by fragments of ostrich eggshells, lithics on Cryptocrystalline silicate and hornfels which is often found on elevated areas and within close proximity of water courses. The location of these



sites (Stone Age) is indicated in the Figure 5-33 below. A historical farmstead and memorial is also recorded during the site assessment (Figure 5-34). Based on the information found from a desktop perspective, it is expected that any archaeological sites found within or surrounding the proposed development will have a General Protected A field rating. Graves are characterised as high social significance and can be expected anywhere within or around the proposed development area.

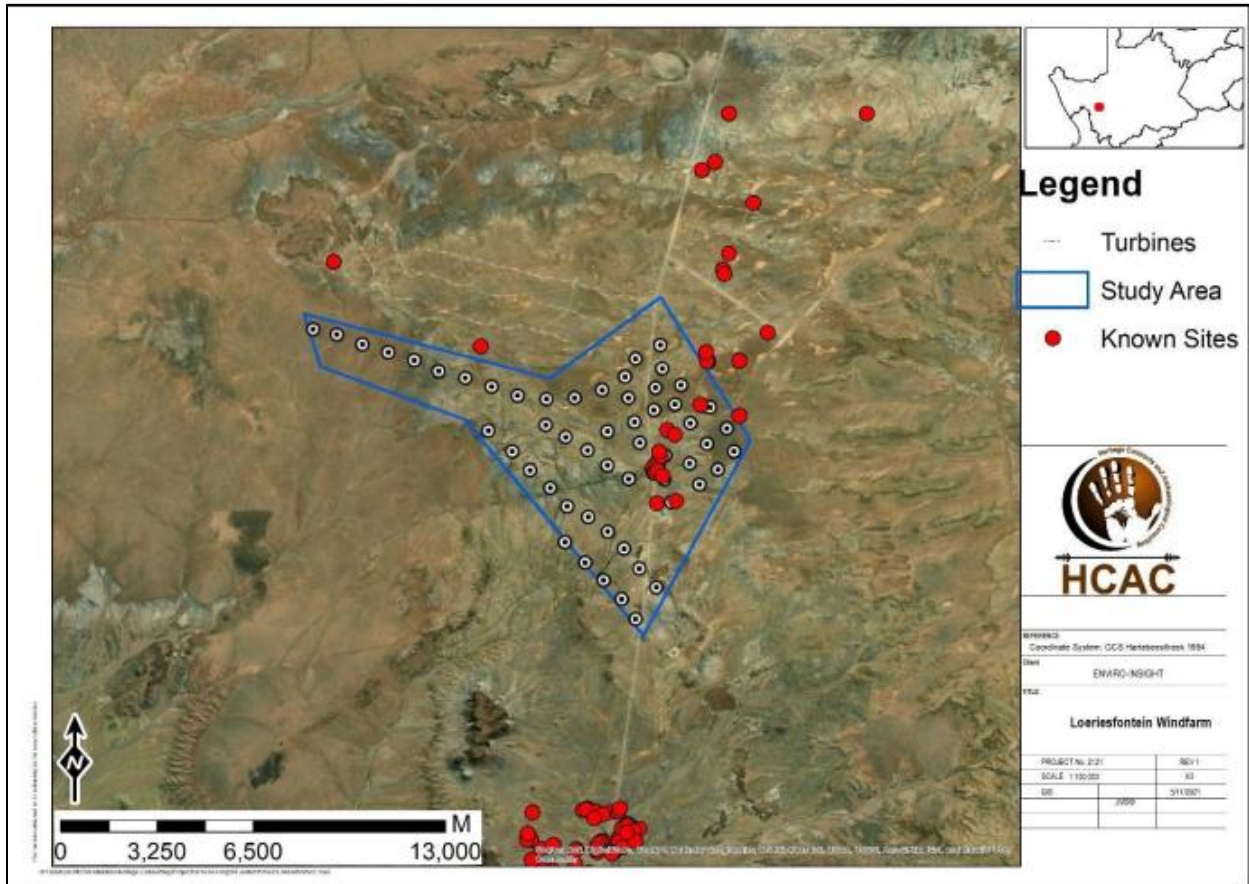


Figure 5-33: Known heritage sites in relation to the proposed layout.



*Figure 5-34: Farmstead and memorial located on site.*

#### 5.14.2 Conclusion

Several Stone Age features were recorded on the study area for the scoping study and will therefore require mitigation measures during the second phase of the project. These features include a historical farmstead and a memorial. It is recommended that a **Phase 1 Heritage Impact Assessment (HIA) should be done** for the study area to therefore comply with the National Heritage Resources Act (Act 25 of 1999). The HIA will include management and mitigation measures should any site be NHS be impacted by the project and therefore ensuring that all requirements are met as per the SAHRA. From a paleontological perspective, the study area is classified as **moderate to high sensitivity**. Therefore, a **palaeontological assessment** in the impact assessment phase will be needed.

#### 5.15 SOCIO-ECONOMIC

The Social Impact Assessment was conducted by Steve Horak of HCV Africa and the full report is included in **Appendix E9**.

##### 5.15.1 Literature review

###### 5.15.1.1 History of Loeriesfontein

Loeriesfontein is a small rural service centre town that lies within a basin surrounded by the Hantam mountains and is situated to the north-west of the town of Calvinia. The town grew around a general store established in 1894 by a travelling Bible salesman, named Fredrick Turner, the son of the sister of the theologian Charles Spurgeon. Fredrick Turner came from Norwich, England. The general store still exists. It is currently owned by Victor Haupt, the grandson of Fredrick Turner. The shop is currently called Turner & Haupt SPAR and has been in the family for 113 years.

### 5.15.1.2 Census and community survey information at glance

Table 5-9 presents information for Loeriesfontein, the HLM and the NDM over the period of the 2011 census and the 2016 community survey. As indicated in limitations the 2016 community survey does not collect data at the local level so the information for Loeriesfontein is only presented for the period 2011. The information presented here is discussed in more detail in the sections to follow.

*Table 5-9: Information in brief. Sources: 2011 Census, 2016 Community Survey.*

Characteristics	Loeriesfontein Census 2011	HLM Census 2011	HLM Community Survey 2016	NDM Community Survey 2016
Total population	2744	21 684	21 540	115 488
Young (0-14)	26%	27.4%	24.2%	22.5%
Working Age (15-64)	64,2%	64.3%	66.9%	68.0%
Elderly (65+)	9.7%			9.5%
Dependency ratio Per 100 (15-64)	55.7	55.5	49.6	47.1
Sex ratio Males per 100 females	98	100.4	101.9	101.5
Education				
No schooling aged 20+	16.8%	13.9%	9.9%	4.4%
Higher education aged 20+	7.1%	7.7%	8.0%	8.0%
Matric aged 20+	17.1%	18.2%	24.7%	24.2%
Households				
Number of households	807	6 392	6 894	37 669
Average household size	3,2	3.2	3.1	3.1
Female headed households	57.7%	33.4%	34.1%	37.6%
Housing				
Formal dwellings	96.3%	96.9%	94.8%	95.2%
Housing owned/paying off	69.5%	53.8%	67.6%	72.6%
Services				
Flush toilet connected to sewerage	4.2%	53.4%	78.3%	67.9%
Weekly refuse removal	96.9%	72.0%	76.2%	81.7%

Piped water inside dwelling	51.3%	59.8%	65.7%	70.5%
Electricity for lighting	92.3%	76.3%	80.9%	88.4%

### 5.15.1.3 Demographics

#### 5.15.1.3.1 Population

Based on census data 2011 the population of Loeriesfontein is estimated at 2 744 people distributed over 34.5 km<sup>2</sup> which translates to a population density 80 persons/km<sup>2</sup>. This is considerably denser than the population density of the Northern Cape at 3 persons/km<sup>2</sup>.

The population of Loeriesfontein is young - 26% are between 0-14 years, 64.2% are of working age and 9.7% are elderly giving a dependency ratio of 55.7. Dependency ratio indicates the proportion of the population not in the workforce who are 'dependent' on those of working-age, it is a calculation which groups those aged under 15 with those over 65 years as the dependants and classifying those aged 15-64 years as the working-age population. A ratio of 55.7 is significantly higher than the district ratio of 47.1 indicating that there is high dependency on those of working age in Loeriesfontein.

#### 5.15.1.3.2 Ethnicity and Language

Of the 2,744 households in Loeriesfontein 86% are Coloured followed by White (11%) Black African (2.0%) and Indian/Asian (0.1%). 98 % of the people living in Loeriesfontein speak Afrikaans as a first language.

#### 5.15.1.3.3 Culture

As reflected in the demographical profile above, 86% of the people living in Loeriesfontein are identified as Coloured people. The term Coloured (also known as Bruinmense, Kleurlinge or Bruin Afrikaners) refers to the ethnic group of mixed race people in South Africa who possess some sub-Saharan African ancestry, but not enough to be considered Black African. Apart from ancestry in sub-Saharan Africa, coloureds also have substantial ancestry from Europe, Indonesia, Madagascar, Malaya, Mozambique, Mauritius, St Helena and Southern Africa. Genetic history studies suggest that this group has the highest levels of mixed ancestry in the world.

Coloured people generally observe two main religions, namely Christianity and Islam, however in the Northern Cape most coloured people follow the Christian religion as reported in the 2016 Stats SA community survey. Only 0.7% of people in the Northern Cape follow the Muslim faith and 95% of Coloured people self-reported as being Christian. In the Western Cape 5.6% of people follow the Muslim faith. These faiths usually result in a conservative outlook on life, people are generally family orientated and community is important.

#### 5.15.1.3.4 Vulnerable Households

According to the Hantam IDP there are 2 978 indigent households in the local municipality, this refers to households earning a combined income of less than R3 200 per month. Another measure of vulnerability is female-headed households in the HLM, 57.7% of households are headed by woman, this is considerably higher than in the NDM of 37.6%. The sex ratio is also higher

for woman in Loeriesfontein at 102 women per 100 men, but this is not significant. Reported persons living with disabilities in the community survey 2016 is 9.8% which is lower than the provincial average of 10.7%.

Loeriesfontein also has a Soup Kitchen project which was established in 2007. This project is funded by the Department of Social Development. The project currently provides soup to 80 people daily with a nutritional meal and 130 households are supported monthly. The presence of soup kitchens is an indication of poverty in communities.

#### 5.15.1.3.5 Housing

96.3% of people living in Loeriesfontein live in formal housing and a high percentage of people own their homes (69.5%) indicating a stable population. This is also higher than the district with 53.8% of people owning their houses in 2011. The average household size is 3,2 which is similar for the HLM and the NDM.

#### 5.15.1.3.6 Crime

Table 5-10 shows the crime statistics for 2018 in comparison with crimes committed in 2017 for the HLM. Overall the crime rates have increased between 2017 and 2018 and drug related crimes are particularly high for the district.

**Table 5-10: Crime stats for Local and District Municipality.**

Nature of Crimes	Hantam Local Municipality	Namaqua District Municipality
Serious crimes	994: was 964 in 2017	4983: was 5264 in 2017
Driving under the influence	19: was 15 in 2017	98: was 88 in 2017
Drug-related crime	331: was 328 in 2017	1355: was 1224 in 2017
Murders	7: was 5 in 2017	24: was 28 in 2017
Sexual offences	22: was 15 in 2017	133: was 163 in 2017

#### 5.15.1.4 Services

##### 5.15.1.4.1 Education

Loeriesfontein has a high percentage of people aged 20+ who have no schooling (16.8%) which is much higher than the NDM at 4.4%. Only 7.1% of people have a higher education aged 20+ and 17.1% have Matric at aged 20+. In terms of school facilities there is both a primary school and a high school.

##### 5.15.1.4.2 Waste management

96.9% of households in Loeriesfontein have weekly waste collection, the highest in the district and the town also has its own landfill site.

#### **5.15.1.4.3 Electricity**

92.3% of households in Loeriesfontein have electricity for lighting, this is higher than for the district of 76.3 % of households in 2011.

#### **5.15.1.4.4 Health**

Loeriesfontein has a clinic and hospital, the nearest large hospital is situated at Calvinia.

#### **5.15.1.4.5 Safety and security**

Loeriesfontein has its own police station.

#### **5.15.1.4.6 Transport infrastructure**

Using the R55 gravel road, the distance between Calvinia and Loeriesfontein is 86km, whilst travelling from Calvinia to Brandvlei requires the utilisation of the R27 tar surface road for a journey of approximately 2.5 hours. There is also a train station in Loeriesfontein.

#### **5.15.1.4.7 Social and Recreational Infrastructure**

The Hantam LM has the following social and recreational infrastructure available:

- Three libraries in Calvinia, Loeriesfontein and Nieuwoudtville
- Seven sport facilities in Calvinia and Loeriesfontein
- Nine religious centres in Loeriesfontein

#### **5.15.1.4.8 Nature reserves**

The Akkerendam Nature Reserve is situated next to Calvinia and is a popular recreation facility for residents. The reserve has hiking trails in the Hantam Mountains with routes of varying difficulty. The municipality and the Department of Environmental Affairs are in talks regarding the management and further development of this nature reserve. The project is currently unfunded in the NDM IDP. Nieuwoudtville has a flower bulb reserve managed by the Municipality that is very popular during the peak flower season. There is also a waterfall on the road between Nieuwoudtville and Loeriesfontein which can be considered a tourist attraction (NDM IDP, 2020/2021).

### **5.15.1.5 Economy**

#### **5.15.1.5.1 Provincial economy**

According to StatsSA (March 2019) the provincial economy grew at 2.84% (2017), an improvement from -1.24% experienced in 2016. Noteworthy, is the fact that the provincial growth of 2.8% in 2017, was above South African GDP growth average of 1.4% for the same period. The GDP of the Province is R 96 billion, of which the mining sector contributes an estimated R19 billion, agriculture contributes R6.8 billion while construction provides R2.6 billion. (NDM IDP, 2020-2021). It is of interest that power generation is not reported despite several largescale renewable energy projects in the Northern Cape.

#### 5.15.1.5.2 Hantam Local Municipality Economy

The Hantam Municipality is a relatively small economy, making up about 13% of 2017 Gross Value Added (GVA) in the Namakwa district – up from 12% in 2016. These contributions in growth are negligible proportions (for both years at 1.6%) of the provincial economy and are like the respective contributions in 2011.

The percentage share contribution by the tertiary sector in 2017 to the total GVA generated in the Hantam municipal area is about 69% or R1012 million compared to 70% or R928 million in 2016. The primary sector contributed 23.5% or R344 million and the secondary sector 7.5% or R111 million in 2017 – increased contributions from the year before.

Between 2000 and 2015, every economic sector in the municipal area grew positively in terms of GVA contribution but manufacturing showed negative growth in recent years. Note that the subsectors do not have high levels of volatility that are typical for, specifically the primary sector.

Electricity, gas and Water secondary sector of the local economy grew by 937% between 2000 and 2015 and at 0.4 % during 2015 and 2016 making this the largest growing sector in the municipality and showing the most growth. However, the Agricultural Primary sector showed the most growth between 2015 and 2016 at 19.2 % (Hantam IDP, 2020/2021).

The significant increase in the subsector contribution of ‘electricity, gas and water’ since 2010, is due to the establishment of renewable energy generation facilities in the municipal area. Note that the contribution in this subsector as well as the ‘transport’ subsector, more than doubled between 2010 and 2015 while the contribution in the ‘construction’ subsector increased substantially between 2015 and 2017, i.e. as an economic activity with strong linkages to the establishment of the renewable energy generation facilities and the Square Kilometre Array (SKA) megaproject. It is reported that SKA has created more than 1000 jobs through infrastructure upgrades and construction on and around the SKA SA site 8. Between 2015 and 2017 the ‘general government’ sector has also shown high growth. The municipality also recognises that the renewable energy sector will continue to make a positive contribution to the economy going forward (Hantam IDP, 2020/2021).

#### 5.15.1.6 Loeriesfontein economy

The Loeriesfontein economy is still dominated by the Agriculture sector and general trade, the hospitality sector has also benefited from accommodating workers during the construction of the two existing WEFs in the area. Although the mining industry currently has a low contribution to the economy, 80% of the world’s gypsum reserves lie just outside Loeriesfontein town, thus an opportunity exists for salt and gypsum mining in the region.

##### 5.15.1.6.1 Tourism in Loeriesfontein

The most significant tourist attraction is the floral display which happens August to September when wildflowers bloom in the veld surrounding the town. The town also boasts a windmill museum which is reported to be the second largest in the world. Quiver Tree Forest located on Gannabos outside of Loeriesfontein is the largest and southernmost colony for this member of the aloe family. Gannabos also offers a B&B, cottage and farmhouse for those wanting to stay a little longer. This is a coveted location for photographers and botanists, and a favourite stop-off for visitors from all over the world who annually visit this region to experience its legendary spring flower extravaganza.

#### 5.15.1.6.2 Wind Energy Facilities in the area

The Northern Cape has the highest volume of renewable energy utility power plants in the country. Loeriesfontein WEF and the Khobab WEF commenced their 20-year commercial operations in December 2017. With a generation capacity of 140 megawatts each, these two neighbouring WEF combined make up the largest single expanse of wind turbines in the country. Together they comprise a total of 122 wind turbine generators, spanning 6 653 hectares. Collectively the wind farms will power approximately 240 000 South African households, positively impacting the country's economy and its people. The WEFs have a combined value of approximately ZAR 7 Billion and are owned by a consortium led by Lekela Power. The majority of the 99m turbine towers were locally manufactured at the Gestamp Wind Turbine Tower Factory in the Western Cape (Khobabwind, 2021).

#### 5.15.1.6.3 The projects contribution to the local economy

The project will contribute to sustainable community growth through financial and non-financial community development initiatives. This will be done by giving back a percentage of total revenue earned to the community; through Socio-Economic Development (SED) and Enterprise Development (ED). This is a requirement for all wind farms.

#### 5.15.1.6.4 Local farm economy

As the project has not been announced it is difficult to develop a baseline for local farm economy where the project will be established. However, the area is mostly suitable for sheep farming and the farms do not offer many jobs since sheep farming is not labour intensive. At the same time agriculture makes a significant contribution to the economy and Loeriesfontein is classified as a rural service centre serving the surrounding farms. A more detailed assessment will be undertaken when the SIA is conducted as part of the EIA specialist studies.

#### 5.15.1.6.5 Employment

Employment and unemployment rates are important as these give an indicator of socio-economic well-being, as employment is how most households generate income to supply their basic needs. Hantam and Loeriesfontein have the lowest unemployment rates as shown in the table below. The data is for 2011 and this situation may look vastly different after the construction of the WEFs have taken place since 2017 in the area, the rates may be even lower.

In the Hantam municipal area, 5 165 (or 38.2%) of the working age population was formally employed in 2017, compared to 5224 (or 39.3%) in 2016 and 5 614 (or 37.4%) in 2001, i.e. a relative improvement in overall formal employment since 2001 but worsening in recent years. These figures also represent a worsening trend if measured in number of persons employed. The number of unemployed persons (802) in the municipal area in 2017 was more or less the same as in 2016 (746) and in 2001 (779). These trends must be seen in the light of the general depopulation of the municipality, i.e. a smaller working age population and the high percentage of persons not economically active. (Hantam, IDP).

### 5.15.2 Potential Impacts

The potential impacts for the proposed development were identified based on information gathering from a desktop point of view, reviewing documentation of previous and similar EIA projects in the area and previous experience from similar assessments. As per the Social Impact Assessment Report, the potential impacts were done for the different phases indicated in the table below:



**Table 5-11: Potential Social Impacts as per the Social Impact Assessment Report.**

Impact Phases	Negative Impacts	Positive Impacts
<b>Construction Phase</b>	<ul style="list-style-type: none"> <li>• Impacts associated with the presence of construction workers on site and in the area.</li> <li>• Influx of job seekers to the area</li> <li>• Impacts on farmers:                             <ul style="list-style-type: none"> <li>➢ risk of stock theft,</li> <li>➢ damage to farm infrastructure associated with construction workers,</li> <li>➢ increased risk of fires.</li> </ul> </li> <li>• Impact of construction vehicles, including:                             <ul style="list-style-type: none"> <li>➢ damage to roads,</li> <li>➢ safety</li> <li>➢ dust.</li> </ul> </li> <li>• Impact on farming activities.</li> <li>• Additional pressure on services offered by the local municipality.</li> <li>• Loss of sense of place</li> <li>• Noise, dust, and visual impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Creation of employment</li> <li>• Business opportunities</li> <li>• Opportunity for skills development; and On-site training.</li> </ul>
<b>Operational Phase</b>	<ul style="list-style-type: none"> <li>• The visual impacts and associated impact on sense of place.</li> <li>• Impact on property values.</li> <li>• Potential impact on tourism.</li> <li>• Noise</li> <li>• Visual impacts</li> </ul>	<ul style="list-style-type: none"> <li>• The establishment of renewable energy infrastructure and generation of clean, renewable energy.</li> <li>• Creation of employment and business opportunities.</li> <li>• Opportunities for skills development and training.</li> <li>• Generation of income for landowner.</li> </ul>
<b>Decommissioning Phase</b>	<ul style="list-style-type: none"> <li>• Loss of jobs and associated income; and</li> <li>• Negative impacts on households which will have become dependent on income generated from the project.</li> </ul>	<ul style="list-style-type: none"> <li>• Short term positive impacts for the deconstruction of the infrastructure.</li> <li>• Short term employment opportunities for deconstruction.</li> <li>• Restoration of sense of place due to reduction of noise and visual impacts.</li> </ul>
<b>Cumulative Impacts</b>	<p>Potential pressure on local services, specifically medical, educational and accommodations with all the renewable energy facilities found within the area. However, this will only be during the construction phase,</p>	

	where higher numbers of workers are found in comparison to operational phase workers. The development will create new jobs, skill development, training and the creation of business opportunities further along the line of the project.
<b>No Development Impacts</b>	Should no development take place, it will result in a lost of several opportunities for South Africa such as lack of energy, renewable energy and opportunities for the districting including the Hantam Local Municipality and Loeriesfontein.

### 5.15.3 Conclusion

The development of the proposed project will not only create employment but also training and business opportunities during the construction phase as well as the operational phase. The negative impacts listed in Table 5-11 can be mitigated if mitigation measures are implemented during these phases of the project. Based on the findings mentioned for the project, the renewable energy project is supported not only nationally but provincially and on local government levels.

The development of the proposed WEF will create employment, training and business opportunities during both the construction and operation phases of the project. The potential negative impacts associated with the construction phase can be mitigated if mitigation measures are implemented. Detailed mitigation measures will be outlined in the Social Impact Assessment Report.

The proposed development will also represent an investment in clean, renewable energy infrastructure for the country which will go some way to offset the negative environmental and socio-economic impacts associated with a coal-based fossil fuel energy generation. Renewable energy, including WEF, also addresses climate change and assists the country in meeting climate change reduction goals.

The potential visual, noise and dust impacts will be assessed from these specialist studies to be undertaken as part of the EIA. The cumulative impacts on the area's sense of place and assessment of significance of impacts will be informed by the findings of these assessments undertaken for the proposed WEF as part of the EIA

### 5.16 TRAFFIC AND TRANSPORTATION

A Traffic and Transportation Impact Assessment report is required to evaluate the expected traffic impact of the proposed development during the construction and operation phase. The report will identify the preferred access route to the site, comment on the condition of the existing roads in the site vicinity, identify possible access points to the site and recommend road improvements to the surrounding road network to accommodate the proposed development.

It is anticipated that the required components will be imported will be shipped from either Saldanha Bay Harbour or Cape Town harbour and then transported by road over a distance of between 20 km and 150 km to the site from Saldanha Bay or Cape Town harbour, depending on the load restrictions. Specialized high lifting and heavy load capacity cranes will be utilised to erect the turbines. The wind farm will be built in one phase, with a total construction period of up to 24 months.

A Traffic and Transportation Impact Assessment will be provided in the EIA phase.

## 5.17 ELECTROMAGNETIC AND RADIO FREQUENCY INTERFERENCE

The South African Radio Astronomy Observatory (SARAO) is a National Facility managed by the National Research Foundation and incorporates all national radio astronomy telescopes and programmes.

The Square Kilometre Array (SKA) project is an international effort (co-hosted between South Africa and Australia) to build the world's largest radio telescope, with a square kilometre (one million square metres) of collecting area. It will have an unprecedented scope in observations, exceeding the image resolution quality of the Hubble Space Telescope by a factor of 50 times, whilst also having the ability to image huge areas of sky in parallel.<sup>9</sup> The South African MeerKAT radio telescope, situated 90 km outside the small Northern Cape town of Carnarvon, is a precursor to the SKA telescope and will be integrated into the mid-frequency component of SKA Phase 1.

The SKA is located in the Nama Karoo of South Africa, providing the perfect radio quiet backdrop for the high and medium frequency arrays that will form a critical part of the SKA's ground-breaking continent wide telescope. In an effort to protect this unique landscape in the country, the Minister of Science and Technology declared three Astronomy Advantage Areas in the Karoo in terms of the Astronomy Geographic Advantage Act (Act 21 of 2007).

A comment was received by SARAO on 17 June 2021 (Appendix D, which indicated that the project represents a low risk of interference to the SKA radio telescope with a required mitigation measure of -5.10 dBm/Hz to reduce interference at the telescope. As such, SARAO do not have any objection to the development. They did, however, recommend that the Applicant should take all precautionary measures to limit the electromagnetic emissions (EMI) in all your electrical cable installations and equipment.

The sensitivity with regards to telecommunications is considered low. Nevertheless, it was attempted to receive feedback from the major telecommunication networks in the area. So far, only Vodacom has responded on 26 May 2021 indicating no objection to the proposed Botterblom WEF as it will have no impact on surrounding Vodacom towers or its existing / future transmission routes (Microwave) in this area.

## 5.18 WAKE IMPACT ASSESSMENT

Wake effect and turbine turbulence occur when wind energy facilities are located in close proximity to one another. Both wake effect and turbine turbulence can occur when a new wind energy facility is established upwind of an existing wind energy facility. Wake effect is the phenomenon that can occur when the new upwind wind energy facility is first in line in receiving and capturing the available wind resource, thereby possibly reducing the quantity of wind available to the downwind facility and, concomitantly, the energy production capabilities of such a facility.

The new upwind facility may also have an impact on the quality of the remaining wind available to the downwind facility to the extent that, as the wind passes through the turbine rotors of the upwind facility, the flow of the remaining wind becomes more turbulent. The more turbulent wind may result in mechanical wear and tear and, therefore, increased maintenance on the

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<sup>9</sup> <https://www.sarao.ac.za/about/>

turbines of the downwind facility. The result may be possible additional downtime and may even result in a decrease in the expected longevity of the turbines.

While the impacts of wake effects and turbine turbulence have not yet been the subject matter of judicial consideration in the country, and despite the relatively limited number of wind energy facilities in the country, they are now being raised by the owners of downwind energy facilities in their legal opposition to the granting of environmental authorisations for the development of proposed new nearby and upwind facilities.

With the DMRE committed to meeting the wind energy targets provided for in the IRP, the declaration by the DFFE of the REDZs in 2018, and the recent identification of new REDZs, it is likely that appeals relating to wake effect and turbine turbulence impacts will become increasingly common. Up to date, the DFFE has not defined or adopted development setbacks to prescribe an acceptable minimum distance needed to be maintained between existing wind energy facilities and proposed new facilities for the wind energy sector. Furthermore, the EIA Guideline for Renewable Energy Projects (dated 16 October 2015) does not include wake effect and turbine turbulence as identified potential environmental impacts of wind energy projects and should be updated to include this based on updated policies. The Applicant is aware of this requirement, and more information will be provided in the EIA phase.

## 6 IMPACT ASSESSMENT

### 6.1 METHODOLOGY

Direct, indirect and cumulative impacts of the issues that will be identified during the specialist investigations will be assessed in terms of these standard rating scales to determine their significance. The rating system used for assessing impacts (or when specific impacts cannot be identified, the broader term issue should apply) is based on five criteria, namely:

1. Status of impacts (Table 6-1) – determines whether the potential impact is positive (positive gain to the environment), negative (negative impact on the environment), or neutral (i.e. no perceived cost or benefit to the environment);
2. Spatial scale of impacts (Table 6-2) – determines the extent of the impact on a scale of localised to global effect. Potential impact is expressed numerically on a scale of 1 (site-specific) to 5 (global);
3. Temporal scale of impacts (Table 6-3) – determines the extent of the impact in terms of timescale and longevity. Potential impact is expressed numerically on a scale of 1 (project duration) to 5 (permanent);
4. Probability of impacts (Table 6-4) – quantifies the impact in terms of the likelihood of the impact occurring on a percentage scale of <5% (improbable) to >95% (definite); and
5. Severity of impacts (Table 6-5) – quantifies the impact in terms of the magnitude of effect on environment (receptor) and is derived by consideration of points 1, 2 and 3 above. For this particular study, a conservative approach is adopted for severity (e.g. where spatial impact was considered to be 2 and temporal impact was considered to be 3, a value of 3 would be adopted as a conservative estimate for severity of impact).

**Table 6-1: Status of Impacts.**

Rating	Description	Quantitative Rating
<b>Positive</b>	A benefit to the receiving environment (positive impact)	+
<b>Neutral</b>	No determined cost or benefit to the receiving environment	N
<b>Negative</b>	At cost to the receiving environment (negative impact)	-

**Table 6-2: Spatial scale of Impacts.**

Rating	Description	Quantitative Rating
<b>Very Low</b>	<b>Site Specific</b> – impacts confined within the project site boundary	1
<b>Low</b>	<b>Proximal</b> – impacts extend to within 1 km of the project site boundary	2
<b>Medium</b>	<b>Local</b> – impacts extend beyond to within 5 km of the project site boundary	3
<b>High</b>	<b>Regional</b> – impacts extend beyond the site boundary and have a widespread effect - i.e. > 5 km from project site boundary	4
<b>Very High</b>	<b>Global</b> – impacts extend beyond the site boundary and have a national or global effect	5

**Table 6-3: Temporal scale of Impacts.**

Rating	Description	Quantitative Rating
<b>Very Low</b>	<b>Project duration</b> – impacts expected only for the duration of the project or not greater than 1 year	1
<b>Low</b>	<b>Short term</b> – impacts expected on a duration timescale of 1 to 2 years	2
<b>Medium</b>	<b>Medium term</b> – impacts expected on a duration timescale of 2-5 years	3
<b>High</b>	<b>Long term</b> – impacts expected on a duration timescale of 5-15 years	4
<b>Very High</b>	<b>Permanent</b> – impacts expected on a duration timescale exceeding 15 years	5

**Table 6-4: Probability of Impacts**

Rating	Description	Quantitative Rating
<b>Highly Improbable</b>	Likelihood of the impact arising is estimated to be negligible; <5%.	1
<b>Improbable</b>	Likelihood of the impact arising is estimated to be 5-35%.	2
<b>Possible</b>	Likelihood of the impact arising is estimated to be 35-65%	3
<b>Probable</b>	Likelihood of the impact arising is estimated to be 65-95%.	4
<b>Highly Probable</b>	Likelihood of the impact arising is estimated to be > 95%.	5

**Table 6-5: Severity of Impacts.**

Rating	Description	Quantitative Rating
<b>Very Low</b>	Negligible – zero or very low impact	1
<b>Low</b>	Site specific and short term impacts	2
<b>Medium</b>	Local scale and / or short term impacts	3
<b>High</b>	Regional and / or long term impacts	4
<b>Very High</b>	Global scale and / or permanent environmental change	5

These five criteria are combined to describe the overall significance rating (Table 6-6). Calculated significance of impact – determines the overall impact on (or risk to) a specified receptor and is calculated as: the product of the probability (P) of the impact occurring and the severity (S) of the impact if it were to occur (Impact = P × S). This is a widely accepted methodology for calculating risk and results in an overall impact rating of Low (L), Low/Medium (LM), Medium (M), Medium/High (MH) or High (H). The significance of a particular impact is depicted in Table 6-7 and assigned a particular colour code in relation to its severity.

**Table 6-6: Significance of Impacts.**

Rating	Description	Quantitative Rating
<b>Low</b>	P × S = 1-3 (low impact significance)	L
<b>Low/Medium</b>	P × S = 4-5 (low/medium impact significance)	LM
<b>Medium</b>	P × S = 6-9 (medium impact significance)	M
<b>Medium/High</b>	P × S = 10-12 (medium/high impact significance)	MH
<b>High</b>	P × S = 13-25 (High impact significance)	H

**Table 6-7: Perceived Significance of Impacts.**

Probability (P)	Severity (S)				
	1	2	3	4	5
1	L	L	L	LM	LM
2	L	LM	M	M	MH
3	L	M	M	MH	H
4	LM	M	MH	H	H
5	LM	MH	H	H	H

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed development;
- **Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed development;
- **Low/Medium:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development;
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development;
- **Medium/High:** the potential impact will affect the decision regarding the proposed activity/development; and
- **High:** the proposed activity should only be approved under special circumstances.

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of the recommended mitigation (and/or optimisation) measures. Mitigation and optimisation measures are either:

- **Essential:** measures that must be implemented and are non-negotiable; or
- **Best Practice:** recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

The model outcome is then assessed in terms of impact certainty and consideration of available information. Where a particular variable rationally requires weighting or an additional variable requires consideration the model outcome is adjusted accordingly.

## 6.2 IDENTIFICATION OF IMPACTS

Potential impacts resulting from the proposed Botterblom WEF were identified during the scoping phase using input from the following sectors:

- Existing information based on literature reviews and desktop assessments (EAP and specialist inputs);
- Site visit with the project team;
- Guidelines;
- Legislation; and
- Views of interested and affected parties (thus far).

The following potential impacts were identified:

- Surface water;
- Disturbance of geology and soils;
- Land uses and capability;
- Socio-economic impacts;
- Sensitive Flora and Fauna;

- Terrestrial Biodiversity / Ecosystem services;
- Traffic and Transportation;
- Dust;
- Noise;
- Visual;
- Heritage and cultural resource impacts; and
- Paleontological Impacts.

### 6.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Currently, a comprehensive impact assessment cannot be conducted for the anticipated impacts; however, the anticipated impacts including cumulative impacts can be discussed and an indication provided whether it will be positive or negative.

All impacts identified in the following tables will require further investigation either by the EAP or by the identified specialist. It is likely that additional impacts will be added based on the results of the site assessments of the EAP and of each specialist.

*Table 6-8: Potential Impacts prior to mitigation measures.*

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
<b>Terrestrial Biodiversity</b>			
Direct	The clearance for the construction of the proposed structures and infrastructure will result in vegetation loss	Negative	<ul style="list-style-type: none"> <li>• Keep the footprint of the disturbed area to the minimum and designated areas only.</li> <li>• Unnecessary vegetation clearing should be avoided.</li> <li>• Ensure rehabilitation plan is initiated during and after construction.</li> <li>• Vegetation clearing on slopes should be minimised and where necessary, appropriate stormwater management should be put in place to limit erosion potential of exposed soil.</li> <li>• No harvesting of indigenous species for firewood should be permitted.</li> </ul>
Indirect	Accidental introduction of alien species and invaders	Negative	<ul style="list-style-type: none"> <li>• Eradication and/ or control of alien invasive plants and weeds as per the alien and invasive species monitoring programme.</li> <li>• Disturbance of natural areas should be avoided as far as possible and the spread of alien flora into natural areas should be controlled.</li> </ul>



Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
			<ul style="list-style-type: none"> <li>• Continuous monitoring of the growth and spread of alien and invasive flora coupled with an adaptive management approach to identify suitable control mechanisms (e.g. mechanical, chemical or biological control). Mechanical control is usually preferred.</li> <li>• Cleaning of vehicles and equipment before entering natural areas to remove large deposits of foreign soils and plant material sourced from elsewhere.</li> </ul>
Direct and Cumulative	Destruction or displacement of flora and fauna species of conservation concern (SCC)	Negative	<ul style="list-style-type: none"> <li>• SCC should either be relocated (by means of the necessary permits) or protected <i>in situ</i>, depending on the species under question and the decision of the competent authority.</li> <li>• Protect suitable habitat for the continued existence of SCC.</li> <li>• The layout design for the proposed WEF should be adjusted to exclude sensitive areas.</li> <li>• Keep the footprint of the disturbed area to the minimum and designated areas only.</li> <li>• An environmental induction for all staff members must be mandatory to discuss these impacts such as the presence of SCC which may not be damaged, caught or removed without a permit.</li> </ul>
Direct and Cumulative	Faunal mortalities	Negative	<ul style="list-style-type: none"> <li>• An environmental induction for all staff members must be mandatory in which specific issues related to the killing and/or disturbance of faunal species should be avoided. Several staff members should complete a snake handling course in order to safely remove snakes from designated areas.</li> <li>• Road mortalities should be monitored by both vehicle operators (for personal incidents only) and the ECO (all roadkill on a periodic monitoring basis as well as specific incidents) with trends being monitored and subject to review as part of the monthly reporting. Monitoring should occur via a logbook system where staff takes note of the date, time and location of the sighting/incident. This will allow determination of the locations where the greatest likelihood exists of causing road mortality and allow mitigation against it (e.g. fauna underpasses, and seasonal</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
			speed reductions). Finally, mitigation should be adaptable to the onsite situation which may vary over time.
Direct and Cumulative	Faunal mortalities	Negative	<ul style="list-style-type: none"> <li>All staff operating motor vehicles must undergo an environmental induction training course that includes instruction on the need to comply with speed limits, to respect all forms of wildlife and, wherever possible, prevent accidental road kills of fauna. Drivers not complying with speed limits should be subject to penalties.</li> <li>The proposed activities may result in the deaths of numerous fauna species. It is suggested that construction activities occur from a predetermined area and move along a gradient to allow fauna species to relocate.</li> <li>The ECO should monitor live animal observations in order to monitor trends in animal populations and thus implement proactive adaptable mitigation of vehicle movements.</li> <li>Should holes or burrows be located on site where construction may occur, contact a zoological specialist to investigate and possibly remove any species located within them.</li> <li>Where possible, barriers around excavation sites should be erected to prevent fauna from falling into the excavations.</li> <li>The proposed substation needs to be demarcated and fenced off to restrict animals from moving into this area, which will reduce fauna mortalities.</li> </ul>
<b>Avifauna</b>			
Direct and Cumulative	Collision	Negative	<ul style="list-style-type: none"> <li>informed curtailment whereby turbines are slowed or stopped;</li> <li>painting one turbine blade black;</li> <li>layout change to optimise turbine layout while protecting bird pathways.</li> </ul>
Direct and Cumulative	Martial eagle nest	Negative	<ul style="list-style-type: none"> <li>removing the Martial Eagle nest when no egg or fledgling is present;</li> <li>appropriate dispersal of the parents away from the current and planned WEFs (not increased likelihood of flying into existing and proposed WEF space);</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
			<ul style="list-style-type: none"> <li>prevention of re-nesting on the same or nearby electricity pylons of the Helios-Juno Line 1 transmission line.</li> <li>should the eagle nest not be removable (pending input from a species-specialist) a precautionary 3 km buffer for this project would be sufficient, but only if the accompanied mitigation measures are implemented.</li> </ul>
Direct and Cumulative	Sensitive habitat features	Negative	<ul style="list-style-type: none"> <li>Avoid sensitive habitats such as watercourses. A 200m is applied where no turbine should be placed.</li> </ul>
<b>Bats</b>			
Direct and Cumulative	Habitat destruction	Negative	Apply necessary buffers for roost sites and sensitive bat features, avoiding the construction of turbines and access roads in these areas. Roads must follow existing farm roads as far as possible
Direct and Cumulative	Bat mortality	Negative	Avoid placement of turbines near sensitive bat features and roosts, adaptive mitigation measures according to post-construction monitoring results (counted strikes) informed by environmental correlates of bat activity
Direct and Cumulative	Bat collisions	Negative	Increase turbine cut in speed as this has been shown to reduce collisions
Direct	Sensitive habitat features	Negative	It is recommended that NO development (including the full rotor swept zone of wind turbines) takes place in BOTH Very High and High bat sensitivity areas. Take note that these areas still need to be defined and will be shown in the final EIA report. Avoid impacts to natural and artificial wetlands and water bodies by implementing the appropriate buffer areas where no development may take place
Direct	Artificial lighting	Negative	With the exception of compulsory civil aviation lighting, minimise artificial lighting at night, especially high-intensity lighting, steady-burning, or bright lights such as sodium vapour, quartz, halogen, or other bright spotlights at sub-station, offices and turbines.
Direct and Cumulative	Flight/migratory paths	Negative	Cut in speeds needs to be increased and possible curtailment during times when bats migrate

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
<b>Aquatic Biodiversity</b>			
Direct and Cumulative	Destruction of wetlands and watercourses	Negative	<ul style="list-style-type: none"> <li>• Construction of infrastructure should not be located within watercourses and associated buffers.</li> <li>• A water use licence application is required for activities within 500m of a wetland.</li> </ul>
Direct and Cumulative	Construction of roads and cable networks	Negative	<ul style="list-style-type: none"> <li>• It is essential that the road and other linear networks (cables) follow contour and lowest gradients as far as possible. Appropriate stormwater design for the road network is essential to prevent roads from serving as concentrated conduits for water run-off, significantly increasing erosion potential and sediment transport capacity. Water diversions along the road should be placed at regular intervals in order to divert water back into the natural veld on the downstream side of the road. This diverted water should be released in a diffuse manner on contour, e.g. appropriately designed swale.</li> <li>• Access roads should preferably be dirt roads on contour. It is essential to choose appropriate water crossing for the road network in order to reduce potential negative impacts. Crossing points should preferably utilise watercourse sections which already contain exposed bedrock and has a low gradient in that particular section of the watercourse. These are ideal natural crossing points which need little intervention so as to ensure that historic stormwater run-off regimes are not altered. Where necessitated crossings should be simple low water bridges that do not interrupt surface or subsurface flows. Concentration of water flow must be avoided. Where water is concentrated it needs to be diffusely released through appropriate diffuse release infrastructure placed on contour and or cutting bedrock to contour, especially on the downstream side.</li> <li>• Watercourse crossings should be aligned perpendicular to the natural flow regime and on contour in order to prevent flow concentration and associated negative impacts.</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
			<ul style="list-style-type: none"> <li>It is recommended that the road lay-out and all final positions of watercourse crossings be appropriately “fine tuned” through field verification in the impact assessment phase in order to minimise potential impacts and reduce road construction cost.</li> </ul>
Direct and Cumulative	Surface water contamination	Negative	<ul style="list-style-type: none"> <li>Prevention of contaminated surface runoff which might impact to the water resource used by downstream users.</li> <li>All hazardous chemical must be stored in a bunded facility. Handling of such chemicals must be undertaken on a non-permeable surface.</li> <li>All hydrocarbons, lubricants and explosives should be adequately stored and bunded off to prevent any contamination to the groundwater during an accidental spill.</li> <li>All water that may collect in an area used for the storage of hydrocarbons must pass through an oil water separator before been discharged as dirty water.</li> <li>Spillages on open soil must be contained and removed and treated as hazardous waste.</li> <li>Emergency response plan to be put in place if spillages occur.</li> <li>Regular inspection should be conducted of storage facilities.</li> </ul>
<b>Geology and Soils</b>			
Direct	Land use change which will affect the soil and land use capability both during construction phase.	Negative	<ul style="list-style-type: none"> <li>The agricultural potential is considered medium to low.</li> <li>Change in land use is required. Application to be submitted to the municipality.</li> <li>Compensate landowners where necessary.</li> <li>Apply for SALA with the Department of Agriculture.</li> <li>Rehabilitation of soil and vegetation after construction and at decommissioning phases to return he land back to for grazing capacity.</li> </ul>
Direct and Cumulative	Site clearance and levelling during the construction phase will cause some additional	Negative	<ul style="list-style-type: none"> <li>Prevent soil loss through erosion.</li> <li>Develop appropriate storm water management system to control surface run off over exposed areas.</li> <li>Preserve topsoil for later use after construction activities.</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
	exposed areas and could trigger erosion and siltation, especially during rainy periods.		<ul style="list-style-type: none"> <li>• Ensure all vehicles stay within the designated areas (for example, away from watercourses).</li> <li>• Plan to construct the majority of development outside peak rain period.</li> <li>• Have in place temporary erosion and sedimentation trapping control measures during the construction phase, where necessary.</li> </ul>
Direct and Cumulative	Storage of topsoil	Negative	<ul style="list-style-type: none"> <li>• Remove and stockpile topsoil from roads, building platforms etc. prior to construction.</li> <li>• Preserve topsoil and store in an appropriate manner to maintain viability and seed bank for future rehabilitation after construction.</li> <li>• Store away from watercourses to prevent sedimentation and erosion.</li> <li>• Protect from alien plant establishment.</li> </ul>
<b>Social</b>			
Indirect and Cumulative	Influx of jobseekers and the impact of temporary construction workers	Negative	The appointed Socio-Economic Specialist must provide recommendations and mitigation measures to ensure that the municipality and the Contractors work together to reduce or alleviate possible negative impacts.
Direct and Cumulative	Employment opportunities	Positive	<ul style="list-style-type: none"> <li>• The construction period of the Botterblom WEF is labour intensive with positive socio-economic consequences. Although not certain at this stage, it is estimated that between 300-400 employment opportunities would become available over the short-term (24-month construction period).</li> <li>• The Socio-Economic Specialist must provide recommendations and mitigation measures to enhance the benefits relating to employment opportunities for the local communities.</li> <li>• Suitable semi and skilled employees should be identified.</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
Direct and Cumulative	Opportunity for skills development; and On-site training	Positive	<ul style="list-style-type: none"> <li>• New skills development for locals;</li> <li>• Enhance job opportunities for future employment.</li> </ul>
Direct and Cumulative	Community development programmes	Positive	<ul style="list-style-type: none"> <li>• Involve the Local and District Municipalities in the ED's and SED's from the onset of the project through open engagement</li> </ul>
<b>Economic</b>			
Direct and Cumulative	Increased income generation for local community	Positive	The Applicant should implement local procurement policies that would enhance local and regional economic benefits.
Direct and Cumulative	Local procurement and Economical injection to the local area	Positive	The Applicant should implement local procurement policies that would enhance local and regional economic benefits.
Direct and Cumulative	Potential impact on tourism	Negative	The area is well known for its natural beauty and flowering season. The proposed development could change the sense of place and hinder tourists from visiting the area. Currently, this is not considered a major impact as the known areas for tourism are located away from the study area, closer to Loeriesfontein.
Direct and Cumulative	Wake effect	Negative	This still needs to be assessed, but a wake effect could reduce the capacity for surrounding wind farms to operate optimally which could have economical impacts.
<b>Noise</b>			
Indirect and Cumulative	Noise emanating from heavy machinery and transport vehicles	Negative	<ul style="list-style-type: none"> <li>• Noise sensitive receptors will be identified that needs to be avoided.</li> <li>• Noisy machinery to be used predominately during daylight hours.</li> <li>• Grievance mechanism to record complaints should be kept on site and investigated.</li> <li>• Regular monitoring of noise to take place.</li> </ul>
<b>Visual</b>			

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
Indirect and Cumulative	Infrastructure (e.g. Contractor's yard, weighbridge, workshop and stores)	Negative	<ul style="list-style-type: none"> <li>Identify visual sensitive receptors that need to be avoided.</li> <li>Reduce the visual impact of temporary structures.</li> <li>Infrastructure should be located away from sensitive and elevated areas.</li> </ul>
Indirect and Cumulative	Location of stockpiles during construction phase	Negative	<ul style="list-style-type: none"> <li>Locate away from roads and settlements as far as possible.</li> <li>Height of stockpiles to be kept as low as possible to reduce visual impact.</li> </ul>
Direct	Lighting pollution	Negative	<ul style="list-style-type: none"> <li>Avoid up-lighting of structures but rather direct the light downwards and focused on the object to be illuminated.</li> <li>Use non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators specifically in the site camps.</li> </ul>
Direct	Shadow Flicker	Negative	The appointed Visual Specialist will assess the possible impact of shadow flicker on the individuals residing in proximity to the Botterblom WEF. Currently, there are no occupied houses on the WEF site and accordingly no significant impacts are expected.
<b>Heritage and Cultural</b>			
Direct and Cumulative	Heritage resources disturbed / destroyed	Negative	The HIA investigation will identify resources and sites to be avoided or removed/ relocated. The specialist recommendations will be required.
Direct and Cumulative	Paleontological sites disturbed / destroyed	Negative	The HIA investigation will identify resources and sites to be avoided or removed/ relocated. The specialist recommendations will be required.
Direct and Cumulative	Cultural places disturbed / destroyed	Negative	The HIA investigation will identify resources and sites to be avoided or removed/ relocated. The specialist recommendations will be required.
<b>Traffic &amp; Transport</b>			



Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
Direct and Cumulative	Increased traffic volumes on the existing road networks	Negative	<ul style="list-style-type: none"> <li>• Speed limits must be implemented on site as well as safety controls.</li> <li>• Construction of access roads within safety limits from other crossings.</li> <li>• Possible road upgrades where required.</li> <li>• Create safe environment for pedestrians, animals and motorists, where necessary.</li> <li>• Create fauna underpasses where necessary (example bridge crossings).</li> </ul>
Direct and Cumulative	Inadequate planning for the transportation of turbine parts and specialist construction equipment to the site.	Negative	<ul style="list-style-type: none"> <li>• Further assessment will be undertaken during the EIA Phase and mitigation will be provided in the EIR and the EMP to reduce this impact.</li> <li>• A Traffic Management Plan must be compiled by a suitably qualified specialist during the Planning and Design Phase/prior to the commencement of the Construction Phase.</li> <li>• Project planning must include a plan for traffic control that will be implemented, especially during the construction phase of the development.</li> <li>• Consultation with the local Road Traffic Unit in this regard should be done early in the planning phase. The necessary road traffic permits should be obtained for transporting parts, containers, materials and construction equipment to the site.</li> </ul>
<b>Health &amp; Safety</b>			
Direct and Cumulative	Roads and vehicles	Negative	<ul style="list-style-type: none"> <li>• Speed limits must be in place on site and before access roads on a provincial or national road.</li> <li>• Ensure drivers are trained in road safety.</li> </ul>
Direct and Cumulative	Health of work force during the construction phase	Negative	<ul style="list-style-type: none"> <li>• Construction workers to wear protective clothing (e.g. masks that minimize dust inhalation, clothing that protects against sunburn and dangerous animals such as snakes (wearing of snake garters))</li> </ul>

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
			<ul style="list-style-type: none"> <li>• Lock away dangerous plant, equipment and material when not supervised or in use.</li> <li>• Dispose of the various types of waste generated in the appropriate manner at the licensed waste fill sites at regular intervals.</li> <li>• Provide safe and clean drinking water and instil regular water breaks to keep workers hydrated.</li> <li>• Provide sufficient chemical /portable toilets at strategic locations that are cleaned regularly.</li> <li>• Keep local emergency contact details on hand at the site office.</li> <li>• Inform the local SAPS and Ward Councillors about the construction progress and time-lines to ensure that they are able to adequately deal with any type of disruptive behaviour which could occur due to the project.</li> </ul>
Indirect and Cumulative	Surrounding neighbours		<ul style="list-style-type: none"> <li>• Personnel are not permitted on other properties without permission.</li> <li>• Avoid conflict with surrounding landowners.</li> </ul>
<b>Air Quality</b>			
Direct and Cumulative	Dust pollution	Negative	<ul style="list-style-type: none"> <li>• The removal of vegetation will be minimised during stripping to reduce the effects of dust pollution as a result of exposed soil.</li> <li>• Water or dust control agents should be used in working areas, and roads will be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage.</li> <li>• Dust monitoring must be undertaken in accordance to the monitoring programme.</li> <li>• It is recommended that topsoil stockpiles should be vegetated to sustain biological components as well as prevent dust emissions.</li> <li>• Reduction of dust fallout levels and particulate matter.</li> </ul>
<b>Electromagnetic Interference (EMI)</b>			

Type of Impact	Impact	Status of Impacts Prior to Mitigation	Proposed Mitigation/ Improvement Measures
Direct and Cumulative	Possible WEF interference to television, radio and microwave signal	Negative	<ul style="list-style-type: none"> <li>• Accurate placement of wind turbines in the planning and design phase can reduce this effect. This includes approval from the relevant companies.</li> <li>• If complaints are received from surrounding landowners regarding this issue, the developer must investigate and mitigate these issues to the best of their abilities. It must be noted that the site is located in a remote part of the country.</li> </ul>

### 6.4 MITIGATION MEASURES

The Impact Mitigation Hierarchy (DEA 2013) will be followed to achieve no overall or limited negative impact on the receiving environment. The Impact Mitigation Hierarchy is a tool which is used reiteratively throughout the project lifecycle to limit negative impacts on the environment. There are four steps/tiers within the hierarchy, and include: Avoid/Prevent, Minimise, Rehabilitate and Offset (Figure 6-1).

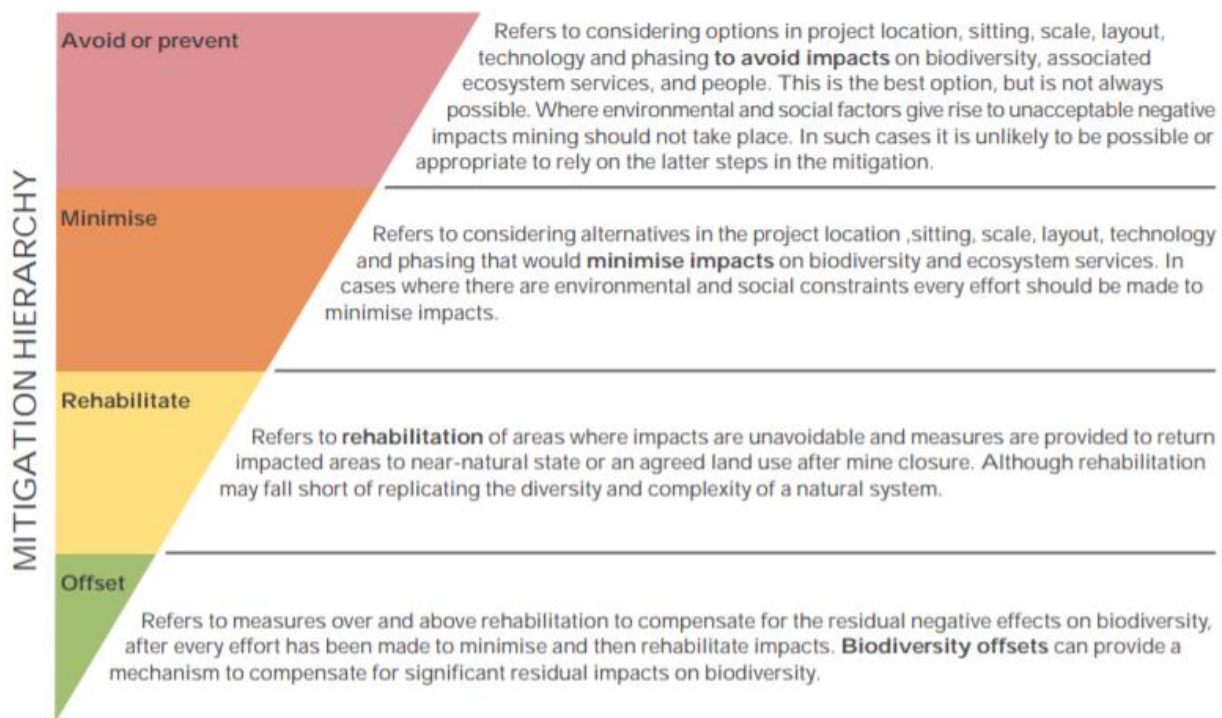


Figure 6-1: The Impact Mitigation Hierarchy (DEA et al., 2013).

Very High impacts should be avoided through alternative layout designs, technology alternatives etc. Where avoidance is not possible, the impacts that are generated by the development should be minimised if measures are implemented in order to reduce the impacts. The proposed mitigation measures should ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development. Where avoidance and/or minimisation is not possible, rehabilitation and possible offset will be considered. These last two options are rarely considered and should only be done if the first two options could not be met. This will be assessed and discussed in more detail during the EIA phase.

## 7 PLAN OF STUDY FOR UNDERTAKING THE EIR

In line with the relevant legislative requirement, this Chapter sets out the Plan of Study (PoS) for the EIA phase of the assessment. Consultation with DFFE will be on going throughout this S&EIA process. However, it is anticipated that DFFE will provide relevant comment with respect to the adequacy of this PoS for the EIA, as it informs the scope and scale of the EIR.

The Scoping Phase has identified potential environmental impacts, specialist studies required to assess these impacts and indicated the alternatives that require further discussion and assessment during the EIA phase. The section below outlines the proposed PoS which will be conducted for the various environmental aspects during the EIA Phase. It is also important to note that the PoS will also be guided by comments obtained from I&AP's and other stakeholders during the commenting period.

### 7.1 ALTERNATIVES CONSIDERED

The NEMA requires that alternatives are considered during the EIA process. Potential alternative options are identified during the scoping phase and will be assessed further in the EIA phase.

The 2014 EIA Regulations (as amended) provide the following definition:

**“alternatives”**, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

- (a) property on which or location where the activity is proposed to be undertaken;
- (b) type of activity to be undertaken;
- (c) design or layout of the activity;
- (d) technology to be used in the activity; or
- (e) operational aspects of the activity;

and includes the option of not implementing the activity;

The following types of alternatives are most pertinent to the proposed project and are detailed further below:

- Location alternatives;
- Layout alternatives;
- Technology alternatives; and
- The “no-go” alternative.

### 7.1.1 Location alternative

The proposed Botterblom WEF was selected based on the following parameters:

- Good wind resource. The average wind speed measured at a height of 100m is estimated to be between 6-8 m/s (Figure 7-1).
- Close proximity to an Eskom substation (Helios substation is embedded within the property) which has the potential to support the proposed WEF project generation capacity.
- Relatively flat site, which makes construction easier and less expensive than on an undulating site.
- Landowner support. The landowner has already signed an agreement and is familiar with the process as the Khobab WEF is located on his property as well.
- There are existing WEFs in the area. Accordingly, the Botterblom WEF will not change the landscape significantly and can make use of existing infrastructure such as haulage routes and align powerlines and substations where possible. This can significantly reduce the disturbance of transmission lines.
- The low density of homesteads in the area which will have low visual, noise and flicker impacts.
- The land has a low agricultural potential and can only be used for low intensity livestock grazing which can continue after construction of the WEF. It should be noted that the landowner no longer keeps cattle for grazing, and accordingly there is no conflict in terms of land use.
- Review of six previous EIRs in the area for the Loeriesfontein and Khobab Wind Farms, Kokerboom 1, 2 and 3, and the Dwarsrug WEF indicated that a WEF development on the proposed site, was likely to be feasible from an environmental sensitivity point of view.

Based on the above, the Botterblom WEF site was selected as the preferred alternative due to the favourable factors listed above.

### 7.1.2 Layout alternative

An initial site layout has been compiled based on *inter alia* the following criteria:

- Spatial orientation requirements of turbines and associated infrastructure (e.g. roads);
- Layout relative to other existing infrastructure, such as powerlines and the Helios substation;
- Wind resource profile (this could have significant technical constraints);
- Topographical constraints, including surface water and steep slopes of hills; and
- Required setbacks from property boundaries for noise, visual and flicker impacts.

Based on the findings of the Scoping Report and specialist studies undertaken during the EIA process, the layout will be updated to include biophysical constraints of sensitive flora, avifauna, and bats, surface water features, sensitive heritage areas, and associated buffer areas. Input from all specialists, stakeholders, and competent authority will be considered in the final layout design and selection of the preferred alternative.

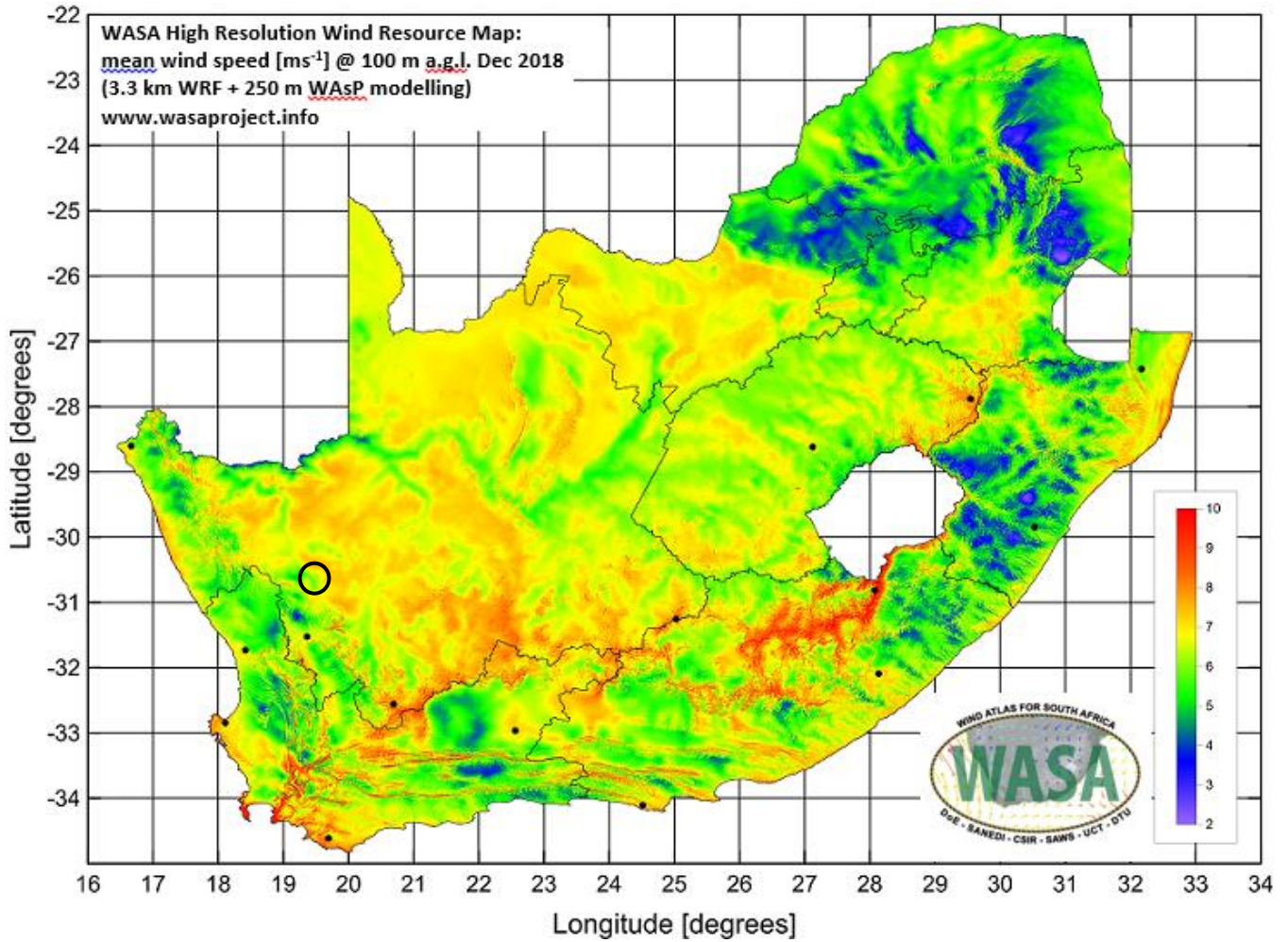


Figure 7-1: Wind resource map: average wind speed as measured at a height of 100m. The general area of the project is indicated by the black circle.

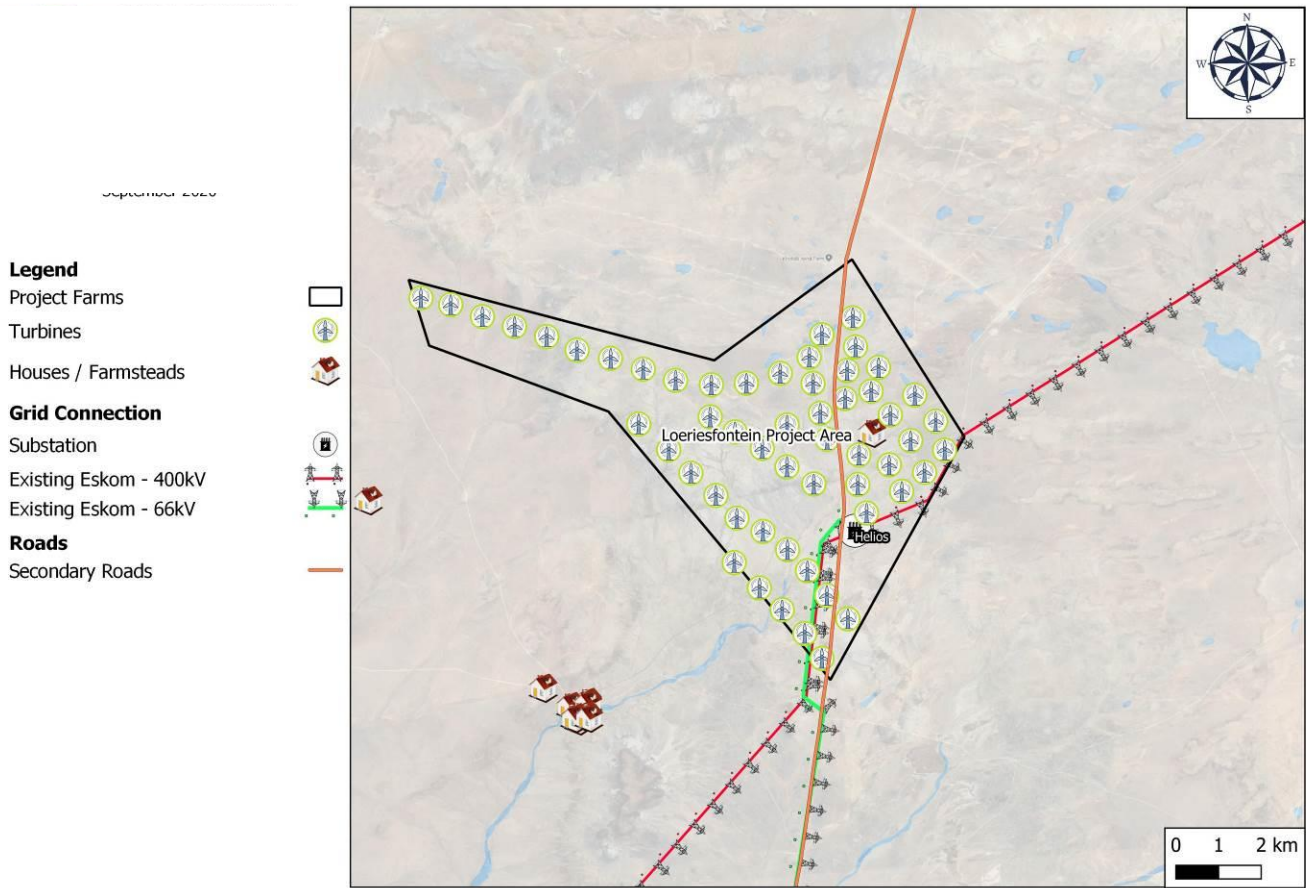
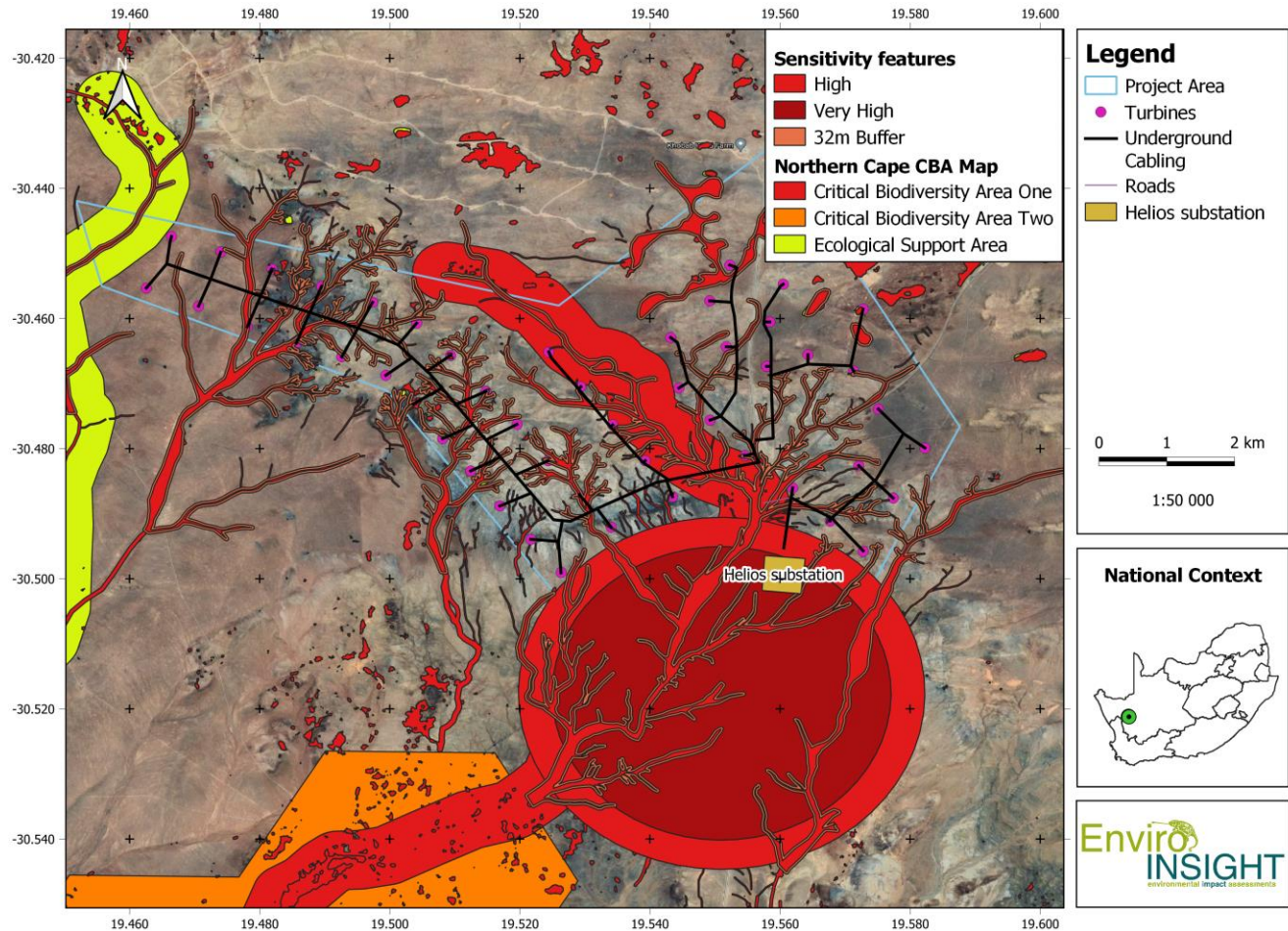


Figure 7-2: Preliminary layout design assessed during the scoping report.



**Figure 7-3: Proposed updated layout design after the scoping report findings based on the combined sensitivity. This is but one suggested layout that will be assessed by the specialists for assessment during the EIA phase, as other alternatives are also being considered.**

### 7.1.3 Technology alternative

The most important factors that are considered when selecting a turbine for any site, are the annual average wind speed, reference wind speed, wind shear and turbulence, the return period for extreme wind conditions and wind direction (i.e. wind resource profile). The ongoing monitoring of the wind resource on site will be used to inform the turbine layout.

Other determining factors when selecting the preferred turbine are efficiency, full load hours and the capacity factor. The pricing of relevant technology at the time of construction is also a key factor, as well as the exchange rate for imported components.



#### 7.1.4 “No-Go” alternative

It is mandatory to consider the “no-go” option in the EIA process. The “no-go” alternative refers to the current status quo and the risks and impacts associated with it.

The no-go alternative would result in the continuation of the current land use at the site which is currently not used for anything, and is therefore considered natural. Historically, it was grazed by livestock. When properly managed, this land can be used to protect the environment, but this is not a necessary or desired outcome and accordingly the land can mainly be used for livestock grazing, should the landowner decide to reintroduce animals (sheep) on the property. The site is currently not degraded due to overgrazing, but certain sections where transmission lines cross through the site and in the main watercourses, alien invasion by *Prosopis* spp. are dominant. This will require rehabilitation of these sites in order to control this species, while maintaining ecosystem functioning and protecting biodiversity. Furthermore, construction activities surrounding the Helios substation increase due to construction of distribution lines. The impact of not continuing with the proposed wind farm development would be advantageous to both terrestrial and aquatic biodiversity (if it is maintained and managed properly), but the positive economic and social aspects will not be realised which means that the local economy will not benefit from this land not being utilised for the intended purpose as the land is currently constraining economic activity.

## 7.2 A DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the EIA phase will be to:

- Identify and assess the environmental (biophysical and social) impacts of the construction, operation, and decommissioning impacts of the proposed development. The cumulative impacts of the proposed development will also be identified and evaluated;
- Alternative activities and locations will be determined and assessed in parallel with the proposed activity;
- Identify and evaluate potential management and mitigation measures that will reduce the negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMP; and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development.

The Impact Assessment Phase has four key elements:

- Specialist Studies: Specialist studies identified during the Scoping Phase and DFFE Screening Report, and any additional studies that may be required by the competent authority, are undertaken as the initial phase of the EIA. The relevant specialists have already been appointed to undertake the various assessments prior to the commencement of the EIA phase in order to identify potential fatal flaws from an early stage in the process and inform the PoS. Specialists will gather baseline information relevant to the study being undertaken and assess impacts associated with the development. Specialists will also indicate areas to be avoided, make recommendations to mitigate negative

impacts and optimise benefits. The resulting information is synthesised into the draft EIAR (with the complete assessment attached to the EIAR) that will be made available to I&APs for review and comment.

- Environmental Impact Assessment Report (EIAR): The main purpose of this Report is to gather environmental information and evaluate the overall impacts associated with the project, to consider mitigation measures and alternative options, and make recommendations in choosing the best development alternative. The EIAR also identifies mitigation measure/management recommendations to minimise negative impacts and enhance benefits. The draft EIAR and associated reports will be made available for public and authority review and comment for a period of 30 days. The availability of the draft EIAR will be communicated to all registered I&APs and will be accessible through various platforms to be confirmed at the time. After comments have been received, the final EIAR will be compiled and submitted to the DFFE for review. This report will assist the DFFE in making an informed decision on whether to grant or reject the proposed development.
- Environmental Management Programme (EMPr): The EMPr provides guidelines to the Applicant and the technical team on how to best implement the mitigation measure/ management recommendations outlined in the EIAR during the construction, operational and decommissioning phase. The EMPr is a law binding document, and once approved it cannot be amended without permission from the DFFE.
- Public Participation Process (EIA Phase): The PPP initiated during the Scoping Phase, is continued. This includes continuous engagement with I&APs and stakeholders which includes consultation meetings, receiving comments, issues and concerns raised by I&APs and the authorities during the review period, and also provides relevant responses to these comments. Comments on the Draft EIAR received from I&APs are included and addressed in the final submitted EIAR in the form of a Comments & Response Report.

### 7.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

The specific challenges and impacts relevant to the proposed Botterblom WEF are the following:

- Impacts on terrestrial ecosystems;
- Impacts on avifauna;
- Impacts on bats;
- Impacts on sensitive flora;
- Impacts on aquatic ecosystems;
- Impacts on the transportation of components during the construction phase;
- Visual Impacts; and
- Impacts on the socio-economic environment of the region.

### 7.4 A DESCRIPTION OF THE PROPOSED METHOD OF ASSESSING THE ENVIRONMENTAL ASPECTS

Refer to section 6.1 for more details.

## 7.5 PARTICULARS OF THE PUBLIC PARTICIPATION PROCESS THAT WILL BE CONDUCTED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Competent authorities, stakeholders and I&APs will be consulted during the initial notification period, the scoping phase, and during the EIA phase.

### ➤ Consultation with the competent authority

A pre-application meeting was held in November 2020, after which communication was maintained via email. Comments on the DSR was obtained and incorporated into the report prior to submitting the FSR to DFFE for approval.

If the scoping report is accepted, the email communication will continue and the competent authorities comments on the draft EIA report will also be sourced. As and when necessary, the competent authority will be consulted throughout the process.

### ➤ Steps to be taken to notify interested and affected parties

A detailed description of the PPP conducted for the scoping phase is described in Section 4.3 above and Appendix C.

I&APs were notified of the proposed application via newspaper advertisements, emails, site and public notices. In addition, consultation meetings with affected landowners and stakeholders will be undertaken during the scoping phase. The PPP will be undertaken in accordance with the NEMA process, the EIA Regulations (2014, as amended) and the Directive in term sof COVID as set out by the Minister (June 2020). An opportunity was provided to the public to register as I&AP's and to provide initial comments, as well as a 30 day review period to comment on the DSR which ended on 1 October 2021. The information submitted by I&AP's will be utilised during the Impact Assessment and compilation of the EIAR where considered necessary. Should the Final Scoping Report be accepted by the DFFE, the EIA phase of the process will commence.

During the EIA phase I&APs, stakeholders and the competent authorities will be notified of the process to be undertaken (similar way as described in Section 4.3 above and as outlined in the EIA Regulations (2014, as amended) and the Public Participation Plan that was submitted to DFFE for approval), will be provided an opportunity to comment on the draft EIAR which will include specialist studies and attend consultation meetings, where relevant.

### ➤ Details of the engagement process to be followed

The process of identifying and contacting landowners, stakeholders and I&APs commenced when I&APs were notified as part of site and public notices, newspaper adverts, emails, and distribution of the Background Information Document (BID). Landowners and their contact details were identified through existing EIA reports, contact details received from registered I&APs and/or Title Deed search for the properties falling within the proposed study area. Proof of notifications and documentation pertaining to the PPP will form part of the public participation records as part of the Scoping and Environmental Impact Assessment phase.

As mentioned above, during the EIA phase, I&APs will be afforded the following opportunities to participate in the project:

- I&APs will be requested via notifications to provide their comments on the project, notified when the draft EIAR will be available for review;

- The EIAR and EMPr will be available for comment for a period of 30 days which will be accessible from Enviro-Insight's website: <http://www.enviro-insight.co.za/download-it/project-downloads/>. CD copies will be made available on request to Enviro-Insight.

All comments and issues raised during the public participation period will be incorporated into the Final EIAR and EMPr to be submitted to the DFFE for review and the final decision-making.

I&APs will be notified about the decision of the competent authority within 14 days of receiving written letters, and will specify any further process that is to be undertaken such as the appeal process.

➤ **Description of the information to be provided to Interested and Affected Parties**

The following information, but not limited to this, will be made available to I&APs:

- Background Information Document (Appendix C): The aim of the BID is to inform all Interested and Affected Parties about the proposed project and process to be followed during the Scoping and EIA phase which includes the undertaking of PPP and environmental impact assessment process for the compilation of the Environmental Impact Assessment and Environmental Management Programme for the proposed development;
- The site plan, scale and extent of activities to be authorised (Appendix B);
- Draft Scoping Report which include:
  - the plan of study;
  - list of activities to be authorised according to NEMA EIA Regulations;
  - indication and discussion of the impacts of activities to be authorised;
  - the proposed specialist studies that will be undertaken as part of the project;
  - discussion of alternatives including location, process and methodology as well as the No-Go alternative; and
  - Details of the relevant legislation that must be adhered to.
- Draft EIAR and EMPr which will include the results from the specialist assessments will also be made available for public review and comment for a period of 30 days; and
- Information will also be made available as requested by the Interested and Affected Parties throughout the process.

## **7.6 A DESCRIPTION OF THE TASKS THAT WILL BE UNDERTAKEN AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**

As discussed in detail in the above sections and summarised below, the following tasks will be undertaken as part of the EIA phase of the project:

- Finalisation of the legislative context within which the activities are located and document how the proposed activity complies with and responds to this;
- Finalisation of the activities triggered under NEMA based on the specialist assessments and the final design layout and specifications;

- Identification of the location of the development footprint within the preferred site based on impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Identification of the most ideal location for the activities within the preferred site based on the lowest level of environmental sensitivity identified during the assessment, especially with the proposed sitting of the turbines and associated infrastructure;
- Determination of the nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and degree to which these impacts can be reversed, may cause irreplaceable loss of resources, can be avoided, managed or mitigated
- Identification of suitable measures to avoid, manage or mitigate identified impacts;
- Detailed specialist studies;
- Continued Public Participation Process;
- Compilation of the draft EIAR and EMPr, and once the consultation, review and commenting period has finished the finalisation of the EIAR and EMPr which will be submitted to the competent authority for review and final decision making.

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## APPENDICES