Spreeukloof Wind Energy Facility, Eastern Cape Province

Final Motivation for amendment of Environmental Authorisation

DEA Ref.: 12/12/20/1778/5

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PROJECT DETAILS

Title	:	Spreeukloof Wind Energy Facility and associated infrastructure, Eastern Cape Province: Motivation for Amendment to the Environmental Authorisation
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Client	:	Spreeukloof Wind Farm (Pty) Ltd
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PURPOSE OF THE REPORT

Rainmaker Energy Projects (Pty) Ltd received an Environmental Authorisation (EA) for the construction of the Spreeukloof Wind Energy Facility, including overhead power line and associated infrastructure on a site (the 'Property') near Molteno in the Eastern Cape Province (DEA ref: 12/12/20/1778/5) on 02 November 2012. The original EIA (which received environmental authorisation (EA) in May 2011) and associated specialist studies considered five wind energy facilities collectively referred to as the Dorper Wind Farm (DEA ref: 12/12/20/1778). The Dorper Wind Farm consisted of five phases: Dorper Wind Energy Facility, Loperberg Wind Energy Facility, Malabar Wind Energy Facility, Spinning Head Wind Energy Facility and Spreeukloof Wind Energy Facility. The authorisation for the Spreeukloof Wind Energy Facility was received following the application to amend the Dorper Wind Farm authorisation (i.e. splitting of the project into phases) for the broader facility. Subsequent amendments have been granted for the project as follows:

- DFFE Ref: 12/12/20/1778/5 (dated 20 May 2013): Amendment to the properties specified for the project, as well as turbine specification changes.
- DFFE Ref: 12/12/20/1778/5/AM3 (dated 13 June 2016): Amendment to the EA validity (extension)
- DFFE Ref: 12/12/20/1778/5/AM4 (dated 15 November 2018): Amendment to the EA validity (extension)

The facility is proposed within the Enoch Mgijima Local Municipality of the Chris Hani District Municipality on the Portion 18 of the Farm Spreeukloof No. 59.

The project is intended to be bid into future rounds of the Department of Energy's (DoE) Renewable Energy Independent Power Producers Procurement (REIPPP) Programme. There have been advancements to wind turbine technology since the issuing of the EA, and the turbines authorised in the EA are therefore not considered to be the most optimised in terms of production and economic consideration and are not manufactured any more. In this regard, Spreeukloof Wind Farm (Pty) Ltd is considering an updated turbine model for the project. The amendment to turbine specifications will result in a change in the proposed facility layout within the area assessed for the wind farm.

The proponent is therefore applying for a substantive amendment (Part II) towards the following:

i. Amendment of turbine specifications, to be as follows: Wind turbine generators (up to 12 turbines), comprising a hub height of 'up to 120m' and rotor diameter of 'up to 176m' from the currently authorised number of 21 turbines with hub height and rotor diameter of 120m and 125m, respectively.
ii. A reduction in the authorised number of turbines from the currently authorised 21 turbines, to reflect as 'up to 12' wind turbines. An updated layout has been provided for the amendment towards reflecting the removal of turbines from that currently authorised.
iii. Update of the project description to reflect the revised co-ordinates of the 132kV grid connection line routing and substation location as per the revised layout.
iv. Amendment to the holder of the Environmental Authorisation
v. Amendment to the capacity of the Spreeukloof Wind Farm
vi. Extension of the Environmental Authorisation (EA) validity by an additional two years.

The proposed amendments to the Environmental Authorisation will result in the optimisation of the facility layout which was submitted to the Department of Forestry, Fisheries and Environment (DFFE) in the EIA process, and subsequent amendments thereto, and allow for the implementation of the most efficient

turbine model available. The layout will however only be finalised during the final design phase, and will be submitted to DFFE at that time for approval in accordance with the requirements of the EA. These amendments to the project are proposed to increase the efficiency of the facility and consequently the economic competitiveness thereof, as well as to avoid environmental sensitivities on the site.

The proposed amendments in themselves are not listed activities, and do not trigger any new listed activity as the proposed amendments are within the original authorised development footprint and do not exceed any thresholds for activities already authorised.

In terms of Condition 6 of the Environmental Authorisation and Chapter 5 of the EIA Regulations of December 2014 (as amended), it is possible for an applicant to apply, in writing, to the competent authority for a change or deviation from the project description to be approved.

Savannah Environmental has prepared this Draft Motivation Report in support of this amendment application on behalf of Spreeukloof Wind Farm (Pty) Ltd. This report aims to provide detail pertaining to the significance and impacts of the proposed change to the project description for interested and affected parties to be informed of the proposed amendments and provide comment, and for the competent authority to be able to reach a decision in this regard. This report is supported by specialist studies to inform the final conclusion regarding the proposed amendments (refer to **Appendix A to F** of this report). This main report must be read together with these specialist studies to obtain a complete understanding of the proposed amendments and the implications thereof.

The Draft Motivation Report has been made available to registered interested and affected parties for a 30-day period from **Friday, 23 July 2021 until Friday, 03 September 2021.** The availability of the Draft Motivation Report will be advertised in the **Die Rep** newspaper on **Friday, 23 July 2021 and Friday, 06 August 2021** (refer to **Appendix H3**). The Draft Motivation Report will be made available for download at (https://savannahsa.com/public-documents/).

All comments received during the review period have been included within a Comments and Responses report and is submitted to the DFFE with this Final Motivation Report for decision making purposes. All changes made in this Final Motivation Report are underlined for ease of reference.

1. OVERVIEW OF THE PROJECT

Rainmaker Energy Projects (Pty) Ltd received an Environmental Authorisation (EA) for the construction of the Spreeukloof Wind Energy Facility, including overhead power line and associated infrastructure on a site (the 'Property') near Molteno in the Eastern Cape Province (DEA ref: 12/12/20/1778/5) on 02 November 2012. The original EIA (which received environmental authorisation in May 2011) and associated specialist studies considered five wind energy facilities collectively referred to as the Dorper Wind Farm (DEA ref: 12/12/20/1778). The Dorper Wind Farm consisted of five phases: Dorper Wind Energy Facility, Loperberg Wind Energy Facility, Malabar Wind Energy Facility, Spinning Head Wind Energy Facility and Spreeukloof Wind Energy Facility. The authorisation for the Spreeukloof Wind Energy Facility was received following the application to amend the Dorper Wind Farm authorisation (i.e. splitting of the project into phases) for the broader facility. Subsequent amendments have been granted for the project as follows:

1.1. **Location**

The authorised Spreeukloof Wind Farm Site is located between the towns of Sterkstroom and Molteno along the R397 main road, in the Enoch Mgijima Local Municipality, which falls within the jurisdiction of the Chris Hani District Municipality in the Eastern Cape Province. The project site including all associated infrastructure is wholly located within the Stormberg Renewable Energy Development Zone (REDZ 4) as determined by the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015 – CSIR/DEA), and formally gazetted on 16 February 2018 (GN 114) and 26 February 2021(GN 142, 144 and 145). The Spreeukloof Wind Farm is to be constructed within the project site on Portion 18 of the Farm Spreeukloof No. 59.

1.2. **Project Description as assessed in the EIA**

Area of approximately 1309.2ha was assessed as part of the Spreeukloof Split EIA process on Farm Spreeukloof 59 and the following infrastructures were authorised.

- 21 Wind Turbines with a total generating capacity of 52.5 MW (each turbine will comprise an approximately 90 m high tower, nacelle and a rotor with its associated blades).
- Two on-site substations - Substation 2 and Substation 3. Substation 2 to be shared with the Spreeukloof Wind Energy Facility and Substation 3 to be shared with Spreeukloof and Penhoek Pass phases)
- Foundations to support the turbine towers.
- Cabling between the project components,
- New overhead power lines These power lines will connect Substation 2 with Substation 3, and Substation 3 with the Eskom 400 kV line.
- Internal access roads approximately 15 km long and 6 m wide in total.
- Small office and/or workshop building (Offices/workshops will most likely be located next to the substation, or as approved by the environmental control officer)
- Laydown area (the laydown area will cover an area of approximately 0.5 ha and will be moved according to the requirements of construction)
- Interim construction facilities (batching plant, civil/electrical storage, site offices, parking)
- Temporary laydown areas
- Crane travel adjacent to acces road + trench for cabling connecting turbines

Rationale for Site Alternative

The proposed site was identified by the applicant based upon several criteria set by significant preceding feasibility studies for wind projects in the Northern Cape, Western Cape, Kwazulu-Natal, and Eastern Cape. The applicant analysed the localised area and deduced that from their initial feasibility assessments that the proposed site is appropriate when considering the financial viability of a project of this nature in the area, as well as both environmental and social considerations. The site-specific environmental impacts for the site were considered through the EIA process. The site displays specific characteristics which made it a preferred site for a wind energy facility. The following site characteristics were considered:

- **Topography and site extent**

The proposed site, being both in a valley, and adjacent to a plateau, ha a significant wind-funnelling effect. As a result, Rainmaker Energy Projects calculates that at least 25-40% more energy will be produced when compared to sites further along the same plateau which have (wind) obstructions and an absence of features which produce this funnelling effect. Furthermore, the proposed site already has significant transmission capability, which further enhances the consideration and suitability for a wind energy facility. The site covers in excess of 13 300 hectares, with matching transmission, which allows for a large installed capacity.

- **Environmental Considerations**

An EIA was performed for the installation of the 400KV Beta-Delphi Transmission line, the construction of which was completed in August 2007. The EIA clearly indicates the suitability of this particular valley for construction of the power line, as opposed to an alternative route 20 km to the east of the proposed site. These reasons included, inter alia, a lower visual impact for the chosen site area, tourism potential for the alternative and ecological considerations such as the number of pans in the alternative route. Finally, the EIA found that the route selected (which runs through the proposed Wind Energy Facility site), was regarded as being previously disturbed by agriculture, making it more suitable for the transmission power line alignment.

- **Land use**

The area of the proposed site consists of vegetation which has been previously disturbed by agricultural activities and is used for stock farming. In addition, it was proposed that, when operational, the wind energy facility will not impact on the production capability of the farms. The proposed site is unique in that it lies in a valley, which is then on a plateau. As such it is expected that the wind turbines shall have significantly less visual effect and visual carry than most potential wind projects in South Africa.

- **Power transmission considerations**

The proposed site has existing transmission lines running through it, suitable for a wind energy facility of this size. As a result, a direct connection point could potentially be made on the site, without any further need for the construction of power lines over adjacent land. Currently, all power in the Eastern Cape is generated by coal power stations situated in the provinces of Limpopo and Mpumalanga. Generation of power in the Eastern Cape at the site proposed for Wind Energy Facility should, therefore reduce existing line losses. This is supported by the National Electricity Regulator of South Africa (NERSA) who, in conjunction with Eskom, developed an Integrated Resource Plan (IRP) for electricity in South Africa where they demonstrated that by reducing the load in East London, results in a net 25.3% savings.

- **Industry and Economic Stimulus**

The proposed wind energy facility will create much-needed economic stimulus in the Eastern Cape region, without the need for major infrastructure upgrades in the form of new roads, ports or transmission. The proposed site is located within the proximity of Molteno, Sterkstroom and Queenstown. The proposed project

has the potential of stimulating employment (requiring labour from the local area), as well as having the knock-on-effects of creating local industry in the form of the service teams required to support the project. The Eastern Cape has a negative population growth as a result of emigration to surrounding provinces and the applicant hopes, through the proposed project, to create an additional economic pull into the region.

- **Regional and South African Power situation**

The Eastern Cape has limited power generation capability. A project of this nature will create new energy generation capability to the region. South Africa is also going through a major power shortage, needing large investments in new power projects. This site yields a high wind regime, therefore creating very reliable and predictable wind energy over the winter periods.

- **Site Access**

The proposed site is well-situated for construction of a wind facility, having a relatively flat topography. Two major roads (N6 and R397) would enable the transport of wind turbines and allow for ease of transport between the site and major ports.

From the pre-feasibility analysis and site identification process undertaken by the applicant, the proposed sites were considered a highly preferred site for wind energy facility development. No further siting alternatives were considered in the EIA process. The applicant's site selection process was based on finding sites with a) minimum potential environmental impact, b) existing infrastructure, and c) aligning this with finding the wind profiles (and resulting energy produced) that maximise energy output for South Africa's needs.

- **Site-specific Layout Design Alternatives**

Through the process of determining constraining factors, the layout of the wind turbines and infrastructure was planned. The overall aim was to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. Specialist software is available to assist developers in selecting the optimum position for each turbine. This turbine micro-siting information was provided to inform the specialist impact assessments. New 132 kV distribution power lines are proposed to connect the individual substations within the facility to the Main on-site substation, which will connect directly into the existing Eskom 400 kV Beta-Delphi transmission line traversing the site. These new power lines are all restricted to the site development footprint itself, without traversing any adjacent land. Therefore, no alternative power line routes/corridors are being considered through the EIA. The sensitivity of the proposed routes for the power lines and proposed substation positions are assessed through this EIA report.

- **The 'do-nothing' Alternative**

The 'do-nothing' alternative is the option of not constructing the wind energy facility on the proposed site near Molteno. The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. There is therefore a need for additional electricity generation options to be developed throughout the country. The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind and that renewable applications are in fact the least-cost energy service in many cases - and more so when social and environmental costs are taken into account. The generation of electricity from renewable energy in South Africa offers a number of socio-economic and environmental benefits. These benefits are explored in further detail in the South Africa Renewable Energy Feed-in Tariff (REFIT)

» **Technology Alternatives**

Besides the significant consideration in selecting the site of an appropriate and viable wind facility in this area, Rainmaker Energy Projects has considered alternative power generation technologies. Though the area has a known coal reserve, this coal is generally of poor quality, is expensive and challenging to mine, and will be of significant environmental consideration should it be mined. Other renewable power generation technologies in the Eastern Cape, such as solar photovoltaic (PV) or concentrated solar thermal (CSP) are not seen to be appropriate for the region for lack of direct solar resources, as well as limited water resources (needed for CSP). Wind energy as a power generation technology can be regarded as one of the most cost-effective energy sources for power generation in this area of South Africa and has further advantages by offsetting carbon and air pollution, as well requiring negligible water usage during operation. Rainmaker Energy Projects will consider various wind turbine designs and finalise the layout in order to maximise the capacity of the site. The turbines being considered for use at this wind energy facility are proposed to be between 2MW and 3MW in capacity. The turbines will have a steel tower of approximately 90m in height, a nacelle and a rotor with its associated blades. The technology provider has not yet been confirmed and will be decided after further wind monitoring and analysis and a detailed tender process. Refer to **figure 1.1 and figure 1.2** for the layout and layout with sensitivities assessed as part of the EIA process

1.3. Potential Environmental Impacts as determined through the EIA Process

From the specialist investigations undertaken within the EIA process for the wind energy facility, the following environmental impacts were identified:

» Potential impacts on birds;
» Potential impacts on bats;
» Potential ecological impact;
» Potential impacts on heritage; and
» Areas of visual impact; and
» Potential noise impact.

1.4. Key conclusions and recommendations of the EIA pertinent to this application

From the specialist investigations undertaken as part of the EIA for the wind energy facility, it was concluded that most impacts are of low to medium significance with the implementation of appropriate mitigation measures. No environmental fatal flaws were identified on the site. However, areas of very high sensitivity were identified and avoided through micro siting of the wind turbines. Areas of sensitivity identified during the EIA process include:

» **Avifauna:**
Although the development area does not impinge significantly on any major bird fly-ways, unique landscape features, it does affect threatened grassland habitat. Populations of regionally or nationally threatened (and impact susceptible) bird species are likely to occur within or close to the turbine arrays, and the proposed facility may have a detrimental effect on these birds, particularly during its operational phase, unless significant commitment is made to mitigating these effects. Careful and responsible implementation of the required mitigation measures should reduce construction and operational phase impacts to tolerable and sustainable levels, especially if every effort is made to monitor impacts throughout, and to learn as much as possible about the impacts of wind energy developments on South Africa avifauna. The proposed facility is likely to have a significant, long-term impact on the avifauna of

the area, and may have a negative effect on key rare, Red-listed and/or endemic species. The most obvious and immediate negative impacts are likely to be on Cape Vulture and other soaring raptors, bustards species and crane species.

These birds may be disturbed by construction of the facility, may lose foraging habitat to the construction footprint or be displaced from the area by the operating turbines (cranes), or may suffer mortalities in collisions with the turbine blades and power lines (vultures and cranes). These effects, which may also impact on other priority species, can probably be reduced to acceptable and sustainable levels by adherence to a proposed mitigation scheme, mainly involving careful and responsible development and management of the facility, with sensitivity to potential, negative impacts and a preparedness to adjust operating procedures in a sincere effort to mitigate such impacts.

A comprehensive programme to fully monitor the actual impacts of the facility on the broader avifauna of the area is recommended and outlined, from pre-construction and into the operational phase of the project.

» **Bats:**

Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the primary cause for mortality is a combination of direct strikes and barotrauma (bats are killed when suddenly passing through a low air pressure region surrounding the turbine blade tips causing low pressure damage the bat's lungs). The relative importance of this impact on bat populations depends on which species are likely to be affected, the importance of the site for those species and whether the site is within a migration corridor for particular bat species.

The most vulnerable species are those that are already classified as threatened species, including those classified as critically endangered, endangered or vulnerable. For any other species, a loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species unless the impact occurs across a wide area that coincides with their overall distribution range. Loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

- Fragmentation of populations of affected species.
- Reduction in area of occupancy of affected species; and
- Loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances. There is one threatened species, the White-tailed Rat and two near threatened bats (Schreiber's long-fingered bat and Darling's horseshoe bat) that could potentially occur on site.

» **Ecology & Freshwater:**

The study area falls within the Karoo Escarpment Grassland and Aliwal North Dry Grassland vegetation type. However, the majority of the proposed site falls within the Karoo Escarpment Grassland vegetation type which is classified as Least Threatened. According to the Eastern Cape Biodiversity Conservation

Plan, a portion of the site is classified as having high conservation value due to it being within an escarpment zone, which is described as an important ecological corridor. The ECBCP is, however, a broad-scale planning tool and does not necessarily take into account local conditions on site. This assessment evaluated sensitivity at a site-scale and is able to more accurately depict site-specific sensitivities.

Other factors that may lead to parts of the study area having high ecological sensitivity are the presence of wetlands within the shallow drainage lines on site, presence of steep slopes in the escarpment and mountain zone and the potential presence of various plant and animal species of conservation concern.

Mountains and ridges are considered to have high ecological value due to the ecological processes that they support. Mountains, ridges and drainage lines (wetlands) represent particularly vital natural corridors as they function both as wildlife habitat, providing resources needed for survival, reproduction and movement, and as biological corridors, providing for movement between habitat patches. Both functions are potentially critical to conservation of biological diversity as the landscape becomes increasingly fragmented into smaller, more isolated patches. Steep slopes can be problematic in constructing infrastructure due to the fact that any impact can have an effect downslope from that point. Depending on the steepness and the length of the slope, particular areas may be more sensitive to disturbance than others. Any steep slopes are therefore considered to have elevated Sensitivity. Potential issues that may arise from development of these areas includes erosion of substrates downslope and the impacts of stormwater runoff.

Other than protected ecosystems and threatened plant and animal species, forests and wetlands are both protected under national legislation (National Forests Act and National Wetlands Act respectively). Any impacts on these vegetation types would require a permit from the relevant National Department. There are three tree species that are protected under the National Forests Act that have a geographic distribution that includes this area. It has been evaluated that no habitat containing or suitable for these species occurs on site and it is therefore unlikely that they occur there.

There are no plant species of high conservation concern (threatened or near threatened) that could occur in available habitats in the study area. Due to the lower-level conservation status of other species, any impacts on them will not affect their conservation status, even if they occur on site. It is therefore concluded that impacts due to the proposed wind energy facility are highly unlikely to affect plant species of high conservation concern.

There are a number of animal species of conservation concern that may occur in habitats within the study area. This includes nineteen mammal species of conservation concern (including one species classified as Endangered and three near threatened bat species), one Near Threatened frog species and two Near-Threatened reptile species. The suitability of habitats for these species was evaluated during the field survey of the site during the EIA. It was evaluated that only the 3 bat species are potentially at risk of significant impacts due to the proposed wind energy facility. The other species are unlikely to occur on site or have the ability to move away during construction and return during operation of the wind energy facility.

Most of the study area appears to still be in natural condition, although some parts may be degraded due to commercial livestock farming, cultivation and alien plant invasions. Any degraded areas on site have been classified as having low sensitivity and conservation value. All other remaining natural

vegetation on site, except for that classified as having high sensitivity, is classified as having medium Sensitivity. This indicates that it is natural but does not have high Sensitivity.

A risk assessment was undertaken which identified nine main potential negative impacts on the ecological receiving environment. The significance of these impacts was assessed during the EIA phase after collection of relevant field data. The identified potential impacts are the following:

1. Impacts on bats
2. Impacts on threatened animals
3. Impacts on threatened plants
4. Impacts on protected tree species
5. Impacts on indigenous natural vegetation
6. Impacts on wetlands
7. Change in runoff and drainage patterns
8. Establishment and spread of declared weeds and alien invader plants
9. Increased risk of veld fires.

Impacts were assessed separately for wind turbines, substations, internal access roads and power lines. A summary of impacts, as evaluated, is provided in the table below.

It must be noted that the assessment of the impacts of the underground cabling was undertaken independently of any other infrastructure. The construction of the wind energy facility will, however, require the construction of internal access roads, which have similar impacts to the construction of underground cables. Taken in combination, the combined impact of the internal access roads and underground cabling will never be higher than the highest individual impact of either one of them.

All infrastructure could potentially have a significant impact on natural vegetation, although it was assessed that this impact would constitute only a small area. The conservation status of the vegetation is not high, and the amount of vegetation destroyed by construction of the wind energy facility will be relatively small (approximately 1-2% of the site).

Wind turbine construction is likely to have significant impacts on wetlands in the study area, due to the fact that a number of the turbines are currently situated within designated wetland areas. Internal access roads and underground cables are also likely to affect various wetland systems. Due to the more extensive impact due to underground cables and internal access roads, these components of the infrastructure will lead to impacts of high significance on wetlands. Potential impacts will have to be carefully controlled to avoid degradation of downstream areas of wetland systems.

Disturbance due to construction of any infrastructure could lead to the spread of alien plants, but this impact can be effectively controlled with suggested measures.

Table 1.1: Summary of ecological impacts

Impact	Wind turbines		Substation		Overhead powerlines		Underground cables		Access roads	
Mitigation	Without	With	Without	With	Without	With	Without	With	Without	With
threatened bats	medium (36)	medium (30)	low (7)	low (7)	low (24)	low (24)	low (12)	low (5)	low (18)	low (16)
threatened animals	low (10)	low (5)	low (16)	low (16)	low (8)	low (8)	low (16)	low (8)	low (16)	low (8)
vegetation	medium (45)	medium (40)	medium (40)	medium (35)	medium (40)	medium (35)	medium (45)	medium (40)	medium (45)	medium (40)
wetlands	medium (60)	medium (55)	low (8)	low (8)	low (22)	low (20)	high (65)	medium (60)	high (70)	medium (60)
runoff/ drainage	low (22)	low (18)	low (22)	low (18)	low (20)	low (8)	low (22)	low (18)	low (22)	low (18)
alien plants	medium (56)	low (20)	medium (56)	low (20)	medium (56)	low (20)	medium (56)	low (20)	medium (56)	low (20)
veld fires	low (24)	low (14)	low (24)	low (14)	low (24)	low (14)	low (24)	low (14)	low (24)	low (14)

The following recommendations are made to reduce impacts or provide additional information that can lead to reduction or control of impacts:

- A monitoring programme should be implemented to document the effect on bats. This should take place before construction (to provide a benchmark), during construction and during operation. This will provide information to quantify the impacts of the present project since such information is not available for similar projects in South Africa.
- Planning of infrastructure position needs to take some factors into account with respect to existing disturbance on site. Existing road infrastructure should be used as far as possible for providing access to proposed turbine positions. Where no road infrastructure exists, new roads should be placed within existing disturbed areas or environmental conditions must be taken into account to ensure the minimum amount of damage is caused to natural habitats and that the risk of erosion or down-slope impacts are not increased. Road infrastructure and cable alignments should coincide as much as possible.

- **Heritage sites and Palaeontology:**

Archaeology: Middle Stone Age artefacts occur widely over the area proposed for development, however, they are predominantly in a secondary context owing to general farm and construction disturbances. It appears that the Middle Stone Age artefacts occur between the ground surface and 30-50 cm below ground as observed by the stone artefacts eroding out of dongas. However, some stone artefacts may still be in situ within areas that have not yet been disturbed. Later Stone Age artefacts occur mainly around the koppies and rocky outcrops, but are also found together with surface scatters of Middle Stone Age and historical artefacts. Stone walling seems to occur randomly on the landscape which may have been used prehistorically, historically and recently. Informal burial grounds and graves older than 60 years occur are also expected to occur on the landscape.

The wind farm site is underlain by several units of potentially fossiliferous continental sediments in the upper, Mesozoic part of the Karoo Supergroup. These Karoo rocks are extensively intruded by unfossiliferous dolerites of the Early Jurassic Karoo Dolerite Suite. Among the Mesozoic units small, peripheral exposures of the Burgersdorp and Elliot Formations are unlikely to be directly affected by the proposed development. Late Caenozoic alluvial sediments in the eastern portion of the study area are of low palaeontological sensitivity.

In contrast, the Late Triassic Molteno Formation that underlies the greater part of the study area is internationally famous for its remarkably rich assemblages of plant and insect fossils. These include the richest Triassic (c. 220 million year old) fossil floras recorded anywhere in the world, as well as some of the oldest known dinosaur trackways. Several key fossil sites are already recorded within the Molteno Formation in the Molteno – Sterkstroom outcrop area. Excavations for new access roads and wind turbine emplacements may well disturb, damage or destroy scientifically valuable fossils during the construction phase of this development.

The area is of a low-medium cultural sensitivity, however there are a number of recommendations which must be considered in order to reduce potential impacts on heritage resources from a high to a more acceptable medium-low significance. There is also the potential for impacts on fossil resources, this impact is potentially of high significance but can be reduced to low significance with the implementation of mitigation and monitoring measures.

» **Visual:**

The construction and operation of the five phases of the proposed Wind Energy Facility and its associated infrastructure will have a visual impact on the natural scenic resources and rural character of this region. The rural and relatively unspoiled wide-open vistas surrounding the facility will be transformed for the entire operational lifespan of the plant.

The primary visual impact, namely the appearance and dimensions of the wind energy facility (mainly the wind turbines) is not possible to mitigate. The functional design of the structures and the dimensions of the facility cannot be changed in order to reduce visual impacts. In addition, no vegetation screening or landscaping would be able to hide structures of these dimensions. The facility and its surrounds should generally be maintained in a neat and appealing way. This also applies to the associated infrastructure (power lines, substations, access roads, etc.) of the facility.

Where visual impacts are significantly exacerbated by their elevated location within the landscape, possible mitigation includes the placement of the wind turbines in relation to the topography (in cases where the turbine layout has not yet been finalised). The analysis of the potential visual exposure of the proposed turbine layout highlights the fact that the placement of the turbines on top of the ridge line (escarpment) tends to increase the frequency of exposure, while the valley surrounding the site and mountainous terrain to the north and south tends to break the frequency of exposure of receptors situated beyond these. Should the majority of the turbines be planned within the valley/central core of the development footprint, the potential visual impacts to the surrounding area could be reduced.

The construction phase of the facility should be sensitive to potential observers in the vicinity of the construction site. The placement of lay-down areas and temporary construction camps should be carefully considered in order to not negatively influence the future perception of the facility. Secondary visual impacts associated with the construction phase, such as the sight of construction vehicles, dust and construction litter must be managed to reduce visual impacts. The use of dust-suppression techniques on the access roads (where required), timely removal of rubble and litter, and the erection of temporary screening will assist in doing this.

» **Noise:**

Wind turbines produce sound, primarily due to mechanical operations and aerodynamics effects at the blades. Modern wind turbine manufacturers have virtually eliminated the noise impact caused by mechanical sources, and instituted measures to reduce the aerodynamic effects. But, as with many other activities, the wind turbines emit sound power levels at a level that does impact areas at some distance away. When potential sensitive receptors are nearby, care must be taken to ensure that the operations at the wind farm do not unduly cause annoyance or otherwise interfere with the quality of life of the receptors.

It should be noted that this does not suggest that the sound from the wind turbines should be inaudible under all circumstances - this is an unrealistic expectation that is not required or expected from any other agricultural, commercial, industrial or transportation related noise source – but rather that the sound due to the wind turbines should be at a reasonable level in relation to the ambient sound levels.

The current impact that the proposed wind energy facility could have on several surrounding potential receptors is considered of potentially high significance. It is critical that the developer consider the mitigation options as proposed in this document to reduce the significance of the impact to a more acceptable low. Should the layout change significantly, it is recommended that the new layout be remodelled/reviewed (if any turbines are within 1,000 meters from a potentially sensitive receptor) in terms of the potential noise impact by an independent acoustics specialist. This includes the situation when the existing layout is slightly modified, yet some of the potentially problematic turbines are still within a radius of 1,000 meters from a potentially sensitive receptor.

This report should also be made available to all potential sensitive receptors in the area, with the contents explained to them to ensure that they understand all the potential risks that the development of a wind energy facility may have on them and their families. With the implementation of the mitigation actions the significance of the impact could be reduced.

As part of the planning mitigation strategy, the applicant considered all the above-mentioned findings and sensitivities, and duly made the necessary amendments to the layout considered in the EIA to reduce impacts to an acceptable level (refer to **Figure 1.1**). No environmental fatal flaws were identified to be associated with the proposed Spreeukloof Wind Energy Facility. Several issues requiring mitigation were however highlighted. Environmental specifications for the management of potential impacts were detailed within the Environmental Management Programme (EMPr) submitted as part of the split EIA.

1.5. Optimised Facility Layout Recommended

As part of the planning mitigation strategy, the applicant considered all the above-mentioned findings and sensitivities, and duly made the necessary amendments to the layout considered in the EIA to reduce impacts to an acceptable level. No environmental fatal flaws were identified to be associated with the proposed Spreeukloof Wind Energy Facility. Several issues requiring mitigation were however highlighted. Environmental specifications for the management of potential impacts were detailed within the Environmental Management Programme (EMPr) submitted as part of the split EIA.

The following infrastructures were recommended to be included within an authorisation issued for Spreeukloof Wind Energy Facility:

The following infrastructure would be included within an authorisation issued for the proposed Spreeukloof Wind Energy Facility:

- 21 Wind Turbines with a total generating capacity of 52.5 MW (each turbine will comprise an approximately 90 m high tower, nacelle and a rotor with its associated blades).
- Two on-site substations - Substation 2 and Substation 3. Substation 2 to be shared with the Spreeukloof Wind Energy Facility and Substation 3 to be shared with Spreeukloof and Penhoek Pass phases)
- Foundations to support the turbine towers.
- Cabling between the project components,
- New overhead power lines These power lines will connect Substation 2 with Substation 3, and Substation 3 with the Eskom 400 kV line.
- Internal access roads approximately 15 km long and 6 m wide in total.
- Small office and/or workshop building (Offices/workshops will most likely be located next to the substation, or as approved by the environmental control officer)
- Laydown area (the laydown area will cover an area of approximately 0.5 ha and will be moved according to the requirements of construction)

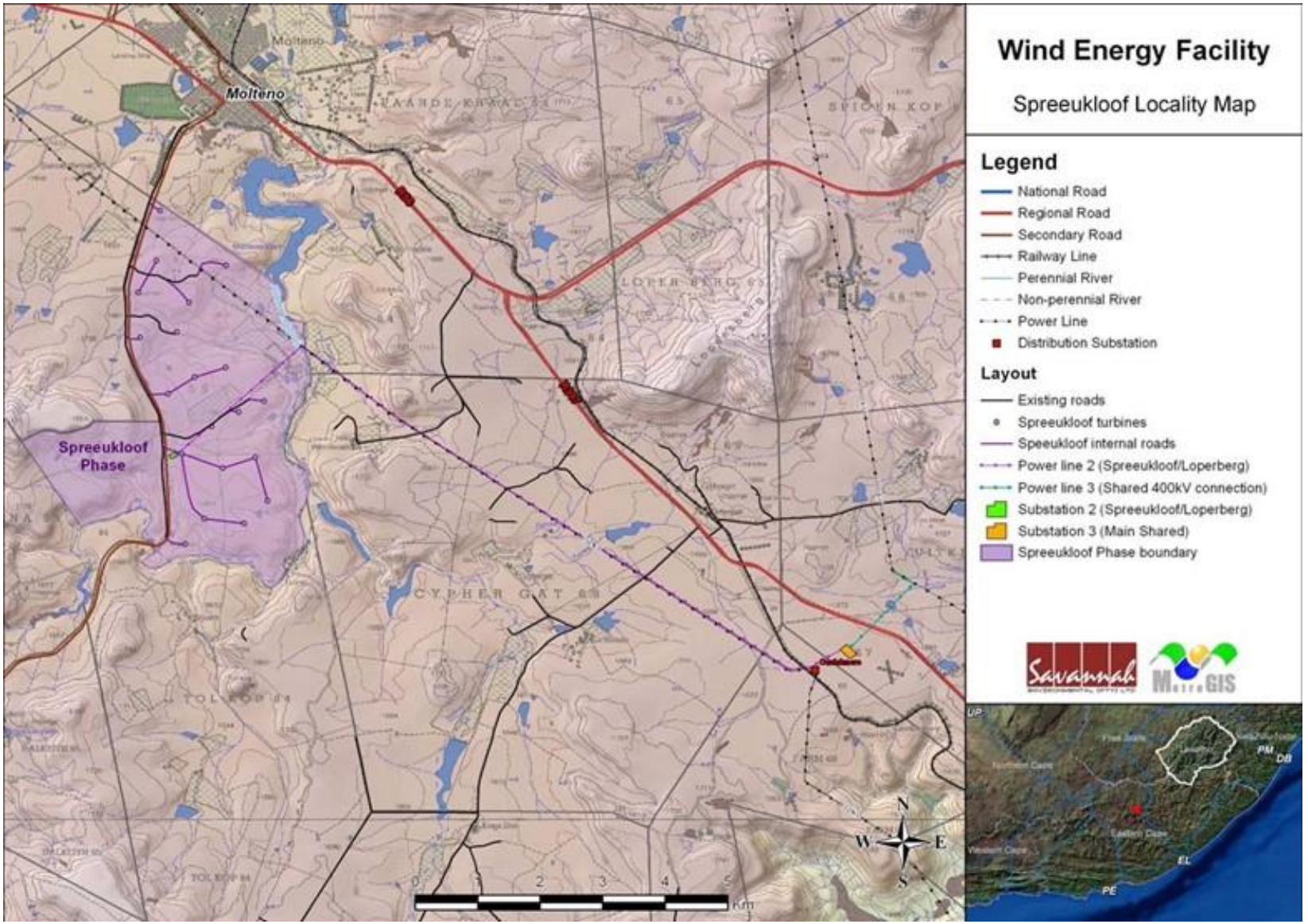

Figure 1.1: Map showing the proposed wind turbine layout, substations and 400kV substations and powerline infrastructure (both new 132kV and 400kV new OHL)

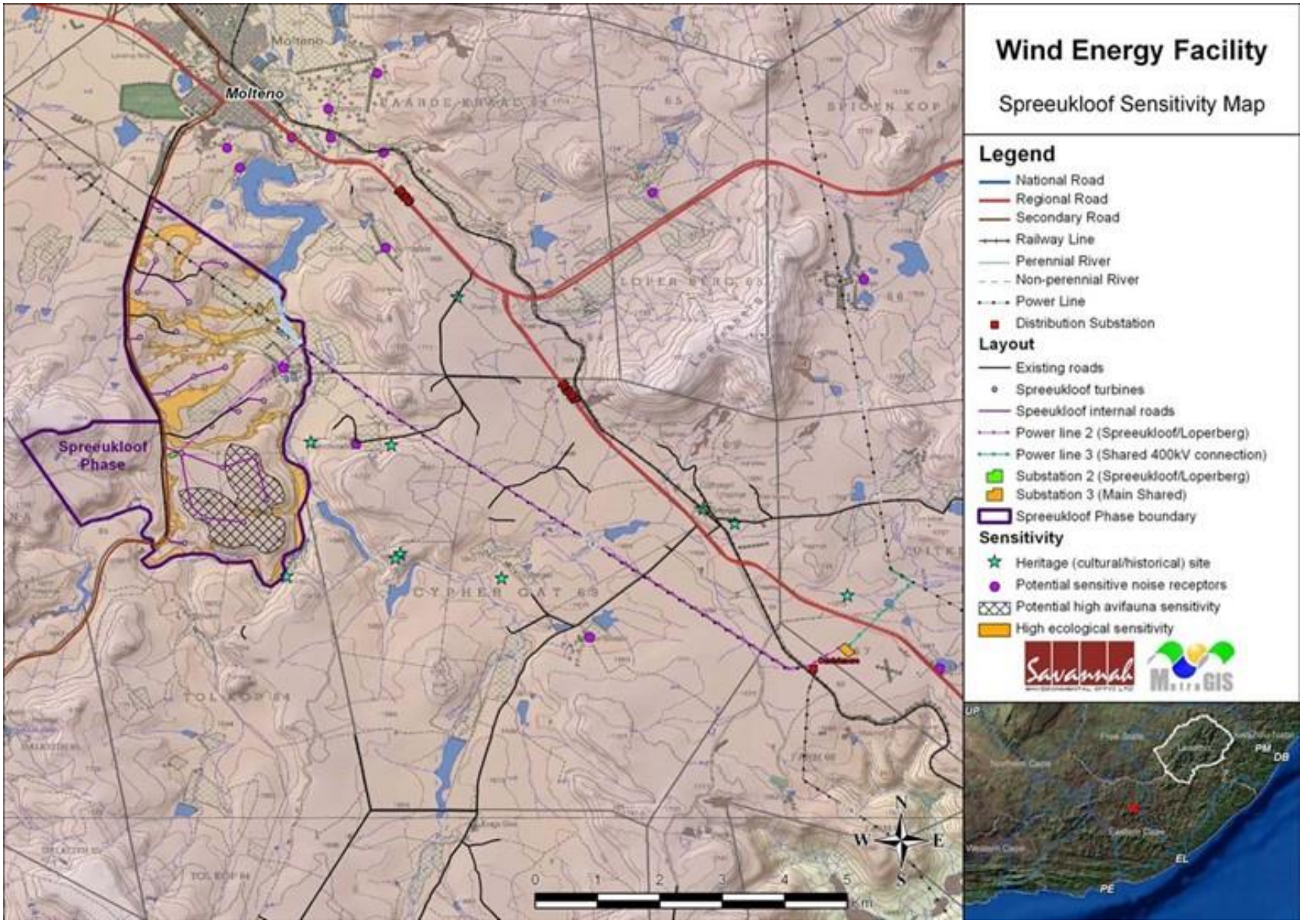

Figure 1.2: Combined Sensitivity map for the Spreeukloof Wind Energy Facility project study area illustrating identified potentially sensitive areas in relation to the wind energy facility layout.

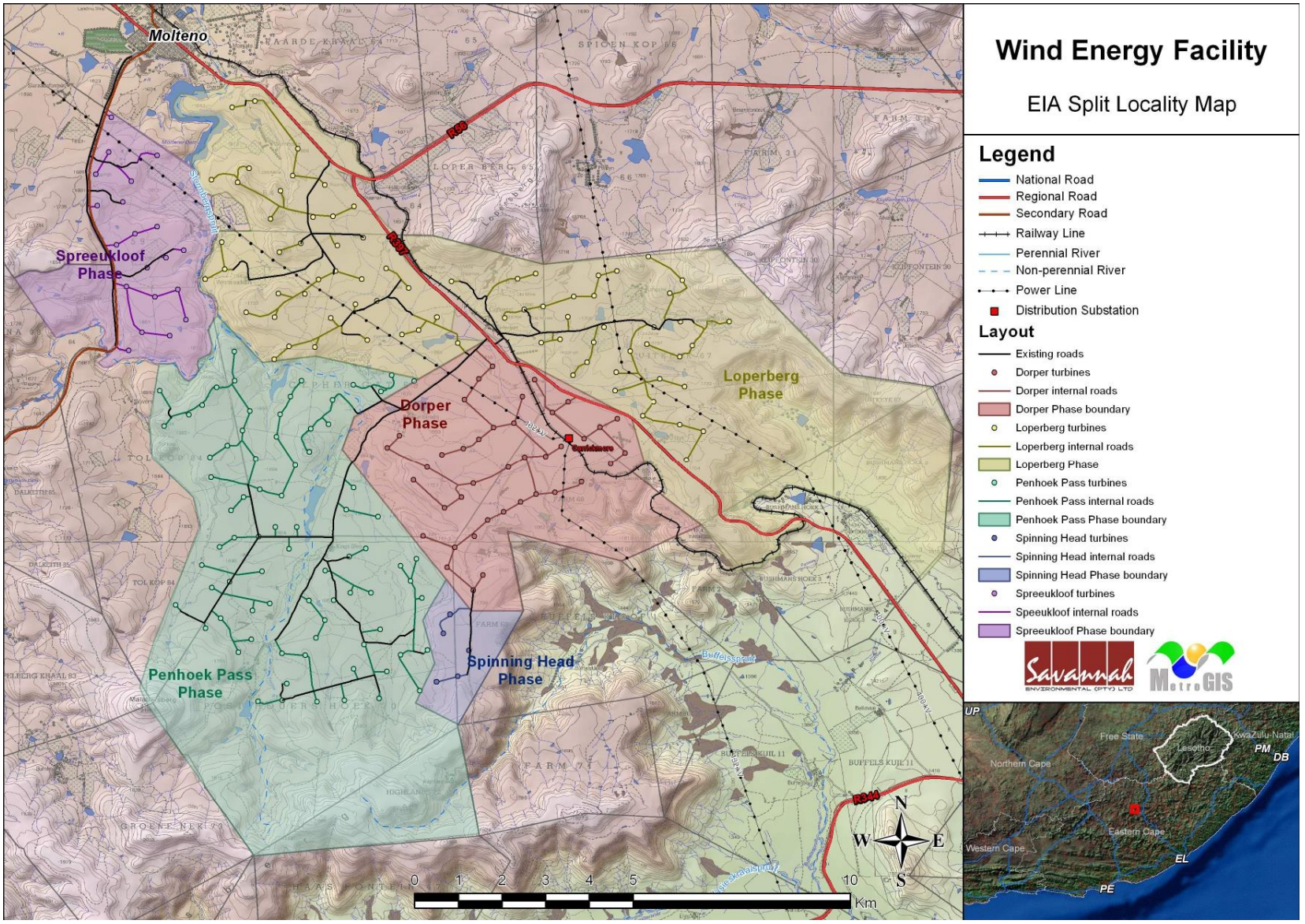

Figure 1.3: Dorper locality map assessed as part of the split EIA, showing the respective phases for the project, of which Spreeukloof is one.

2. DETAILS OF THE AMENDMENTS APPLIED FOR

The amendments being applied for relate to the project description of the EA as amended (DFFE Ref: 12/12/20/1778/5), by decreasing the number of turbines and changing the turbines specifications, updating of the project description, amendment of the holder of the EA and by requesting an increase in the capacity of the facility. These are detailed further below.

2.1. Amendment of the turbine specifications

On page 4 of the EA dated 02 November 2012, under the associated infrastructure, the specified rotor diameter is requested to be amended from '125m' to reflect as 'up to 176m'. In addition, an update of the authorised range of the hub height from '120m' (authorised in 2013) to reflect as 'up to 120m' is requested. The following amendment wording is therefore requested:

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
The infrastructure associated with this facility includes: • A maximum of 21 wind turbine units (approximately 90m high steel tower and nacelle; approximately 100 m diameter rotor – consisting of 3 x 50 m blades).	The infrastructure associated with this facility includes: • <u>Wind turbine generators (up to 12 turbines), comprising a hub height of up to 120m and rotor diameter of up to 176m.</u>

2.2. A reduction in the authorised number of turbines from the currently authorised turbine number, to reflect as per the revised layout

The number of wind turbines are proposed to be decreased from the currently authorised 21 turbines, to 'up to 12' turbines. It is therefore requested that the project description in the EIA be amended to include the revised number of turbines.

On page 4 of the EA dated 02 November 2012, under the associated infrastructure, the following amendment is requested: (Amendment shown in underlined text).

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
The infrastructure associated with this facility includes: • A maximum of 21 wind turbine units (approximately 90m high steel tower and nacelle; approximately 100 m diameter rotor – consisting of 3 x 50 m blades).	The infrastructure associated with this facility includes: • <u>Wind turbine generators (up to 12 turbines), comprising a hub height of up to 120m and rotor diameter of up to 176m.</u>

Please note that the hub height and rotor diameter amendment wording included above is considered in amendment no. 1 (section 2.1) above.

A revised layout is provided in **Figure 2.1.** It must be noted that this layout is not submitted for approval at this time. The final layout will be submitted following final design prior to construction as per the requirements of Condition 28 of the EA.

2.3. Update of the project description to reflect the revised co-ordinates of the 132kV grid connection line and substation locations as per the revised layout

A revised location of the substation and grid connection is requested to reflect that proposed as part of the updated layout. Subsequently the following changes are requested:

On page 4 of the EA dated 02 November 2012, under the associated infrastructure, the following amendment is requested: (Amendment shown in underlined text).

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
The infrastructure associated with this facility includes: • This project will share Substation 2 and 3 with Penhoek Wind Energy Facility.	The infrastructure associated with this facility includes: • This project will share <u>Substation 3 with Loperberg</u> Wind Energy Facility.

On page 4 of the EA dated 02 November 2012, the <u>inclusion of a new table</u> specifying the grid connection coordinates requested for approval under the revised routing:

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)		
No specific wording – this amendment is a novel inclusion only and not a modification of existing text.	<u>Grid Connection Start, Middle and End points as described in the motivation report dated August 2021</u>	<u>Latitude</u>	<u>Longitude</u>
	<u>Start</u>	<u>31°26'51.47"S</u>	<u>26°21'10.99"E</u>
	<u>Middle</u>	<u>31°27'54.64"S</u>	<u>26°25'16.73"E</u>
	<u>End</u>	<u>31°27'12.72"S</u>	<u>26°25'56.31"E</u>

On page 4 of the EA dated 02 November 2012, under the infrastructure associated with the facility:

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
No specific wording – this amendment is a novel inclusion only and not a modification of existing text.	• <u>A 132kV overhead power line from the on-site substation 2 within the Spreeukloof WEF project site, to substation 3, shared with Loperberg WEF;</u>

2.4. Amendment to the holder of the Environmental Authorisation.

A change in holder of the EA is requested, by amending the Specialist Purpose Vehicle (SPV) / company currently holding the EA. Subsequently the following changes are requested:

On page 1 of the EA dated 02 November 2012, under Holder of the authorisation:

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
Rainmaker Energy Projects (Pty) Ltd	<u>Spreeukloof Wind Farm (Pty) Ltd</u>

On page 2 of the EA dated 02 November 2012, under Holder of the authorisation:

Current wording (EA dated 02 November 2012)	Requested amendment wording (inclusion underlined)
RAINMAKER ENERGY PROJECTS (PTY) LTD Mr. Douglas Jenman Rainmaker Energy Projects (Pty) Ltd P.O. Box 163 Newlands Cape Town 7725 Tel: (021) 674 0429 Fax: (086) 582 1792	Spreeukloof Wind Farm (Pty) Ltd Mr. Douglas Jenman Spreeukloof Wind Farm (Pty) Ltd P.O. Box 163 Newlands Cape Town 7725 Tel: (021) 674 0429 Fax: (086) 582 1792

2.5. Amendment to the capacity of the Spreeukloof Wind Farm

The facility generating capacity is requested to be increased by up to 10MW generating capacity above that currently authorised, to optimise and maximise the facility generating potential in line with the amended turbine specifications proposed. The following changes are requested:

On page 2 of the EA dated 02 November 2012, in the listed activities table:

<table>
<tr><th>Current wording (EA dated 02 November 2012)</th><th>Requested amendment wording (inclusion underlined)</th></tr>
<tr><td>
<table>
<tr><td>GN R. 387 Item 1(a)
The construction of facilities or infrastructure, including associated structures or infrastructure for the generation of electricity where (i) the electricity output is 20 megawatts or more; or (ii) the elements of the facility cover a combined area in excess of 1 hectare</td><td>This project will generate a maximum of 52.5MW</td></tr>
</table>
</td><td>
<table>
<tr><td>GN R. 387 Item 1(a)
The construction of facilities or infrastructure, including associated structures or infrastructure for the generation of electricity where (i) the electricity output is 20 megawatts or more; or (ii) the elements of the facility cover a combined area in excess of 1 hectare</td><td>This project will generate a maximum of 62.4MW</td></tr>
</table>
</td></tr>
</table>

On page 3 of the EA dated 02 November 2012, under the infrastructure associated within this facility:

Current wording (EA dated 02 November 2012), as amended by 12/12/20/1778/5 dated 20 March 2013	Requested amendment wording (inclusion underlined)
The infrastructure associated with this facility includes: • A maximum of 21 wind turbine units with a hub height of 120 metres and a rotor diameter of 125 metres. • Concrete foundations (approximately 20m x 20m x 2m) to support the turbine towers; • Underground electrical distribution cabling between the turbines;	The infrastructure associated with this facility includes: • Wind turbine generators (up to 12 turbines), comprising a hub height of up to 120m and rotor diameter of up to 176m. • Concrete foundations (approximately 20m x 20m x 2m) to support the turbine towers; • Underground electrical distribution cabling between the turbines;

• This project will share Substation 2 and 3 with Penhoek Wind Energy Facility; • Internal access road of approximately 15km long and 6m wide; • Small office and/or workshop building for maintenance; • Laydown area cover of approximately 0.5ha; and • A maximum output capacity of 52.5 Megawatts (MW).	• This project will share Substation 3 with Loperberg Wind Energy Facility. • Internal access road of approximately 15km long and 6m wide; • Small office and/or workshop building for maintenance; • Laydown area cover of approximately 0.5ha; and • A maximum output capacity of 62.4 Megawatts (MW)

On page 4 of the EA dated 02 November 2012, under the Scope of Authorisation:

Current wording (EA dated 02 November 2012), as amended by 12/12/20/1778/5 dated 20 March 2013	Requested amendment wording (inclusion underlined)
2. The proposed Spreeukloof Wind Energy Facility is hereby approved for the footprint of approximately 1309.2 ha and a maximum output capacity of 52.5MW.	2. The proposed Spreeukloof Wind Energy Facility is hereby approved for the footprint of approximately 1309.2 ha and a maximum output capacity of 62.4MW.

2.6. Extension of the Environmental Authorisation (EA) validity by an additional two years

Condition 7 of the original EA (Page 5) dated 02 November 2012 (12/12/20/1778/5) states that the proposed activity must commence within a period of three (3) years from the date of issue. Thereafter, subsequent amendment applications have been completed and further validity period extensions granted. The current authorised validity period expires on 02 November 2022 (refer page 1of the Amendment EA dated 15 November 2018, DFFE Reference: 12/12/20/1778/5/AM4). The applicant hereby requests the Competent Authority to amend Condition 7 of the original EA (Page 5) dated 02 November 2012 (12/12/20/1778/5) concerning the validity period by the addition of two years validity, as follows:

Current wording (EA dated 02 November 2012), as amended by: • DFFE Ref: 12/12/20/1778/5 (dated 20 May 2013): Amendment to the properties specified for the project, as well as turbine specification changes. • DFFE Ref: 12/12/20/1778/5/AM3 (dated 13 June 2016): Amendment to the EA validity (extension) • DFFE Ref: 12/12/20/1778/5/AM4 (dated 15 November 2018): Amendment to the EA validity (extension)	Requested amendment wording (inclusion underlined)
7. This activity must commence within a period of three (3) years from the date of issue. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.	7. This activity must commence within the period ending on 02 November 2024. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.

2.7. Summary of amendments applied for

The table below provides a detailed comparison of the project description included in the EA as authorised on 02 November 2012 (12/12/20/1778/5) and subsequent amendments with the proposed project components which are requested to be amended within this amendment process.

Component	Authorised turbine specification	Amended turbine specifications
Number of turbines and amendment of turbine specifications	A maximum of 21 wind turbine units (approximately 90m high steel tower and nacelle; approximately 100m diameter rotor -consisting of 3x50m blades)	Wind turbine generators (up to 12 turbines), comprising a hub height of up to 120m and rotor diameter of up to 176m.
Substation	This project will share Substation 2 and 3 with Penhoek Wind Energy Facility.	This project will share Substation 3 with Loperberg Wind Energy Facility.
Powerline route	No specific wording – this amendment is a novel inclusion only and not a modification of existing text.	Grid Connection Start, Middle and End points as described in the motivation report dated August 2021 / Latitude / Longitude Start / 31°26'51.47"S / 26°21'10.99"E Middle / 31°27'54.64"S / 26°25'16.73"E End / 31°27'12.72"S / 26°25'56.31"E
Project description and listed activity amendment	No specific wording – this amendment is a novel inclusion only and not a modification of existing text.	A 132kV overhead power line from the on-site substation 2 within the Spreeukloof WEF project site, to substation 3, shared with Loperberg WEF;
Amendment to the holder of the EA	Rainmaker Energy Projects (Pty) Ltd	Spreeukloof Wind Farm (Pty) Ltd
Increase facility generation capacity	This project will generate a maximum of 52.5MW	This project will generate a maximum of 62.4MW
Extension of the Environmental Authorisation (EA) by an additional two years	7. This activity must commence within a period of nine (09) years from the date of issue of this authorisation.	7. This activity must commence within the period ending on 02 November 2024. If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken.

The layout of the facility as submitted in the final EIA Report (2012) is indicated below in **Figure 2.1** overleaf. Furthermore, the combined sensitivity map as utilised in the final EIA Report (2012) is shown in **Figure 2.2** and a proposed layout assessed as part of this amendment is indicated in **Figure 2.3**.

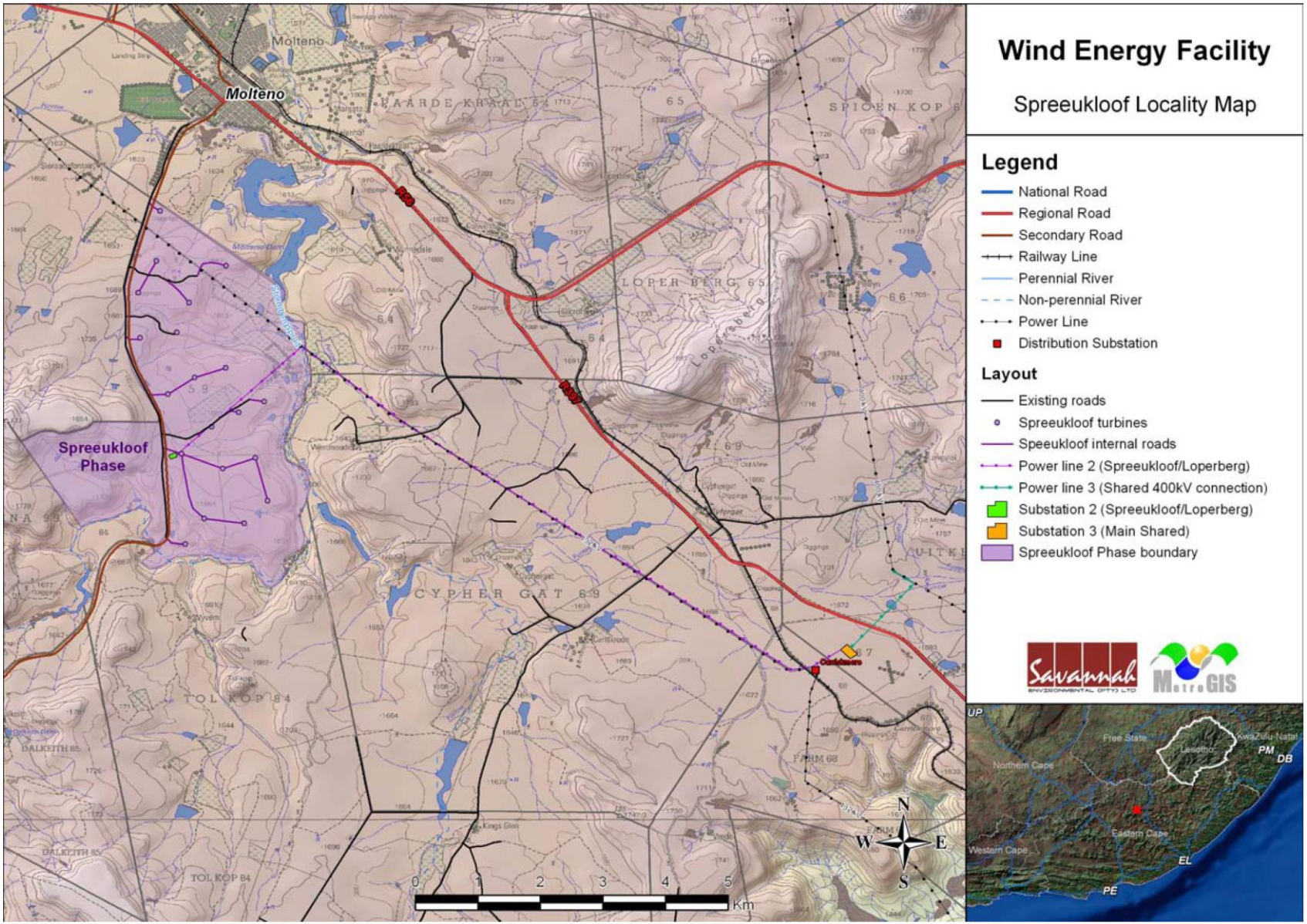

Figure 2.1: Spreeukloof split EIA locality map (2012), showing turbine positions, 132kV substations and 400kV substations and powerline infrastructures (both new 132kV and 400kV new OHL .

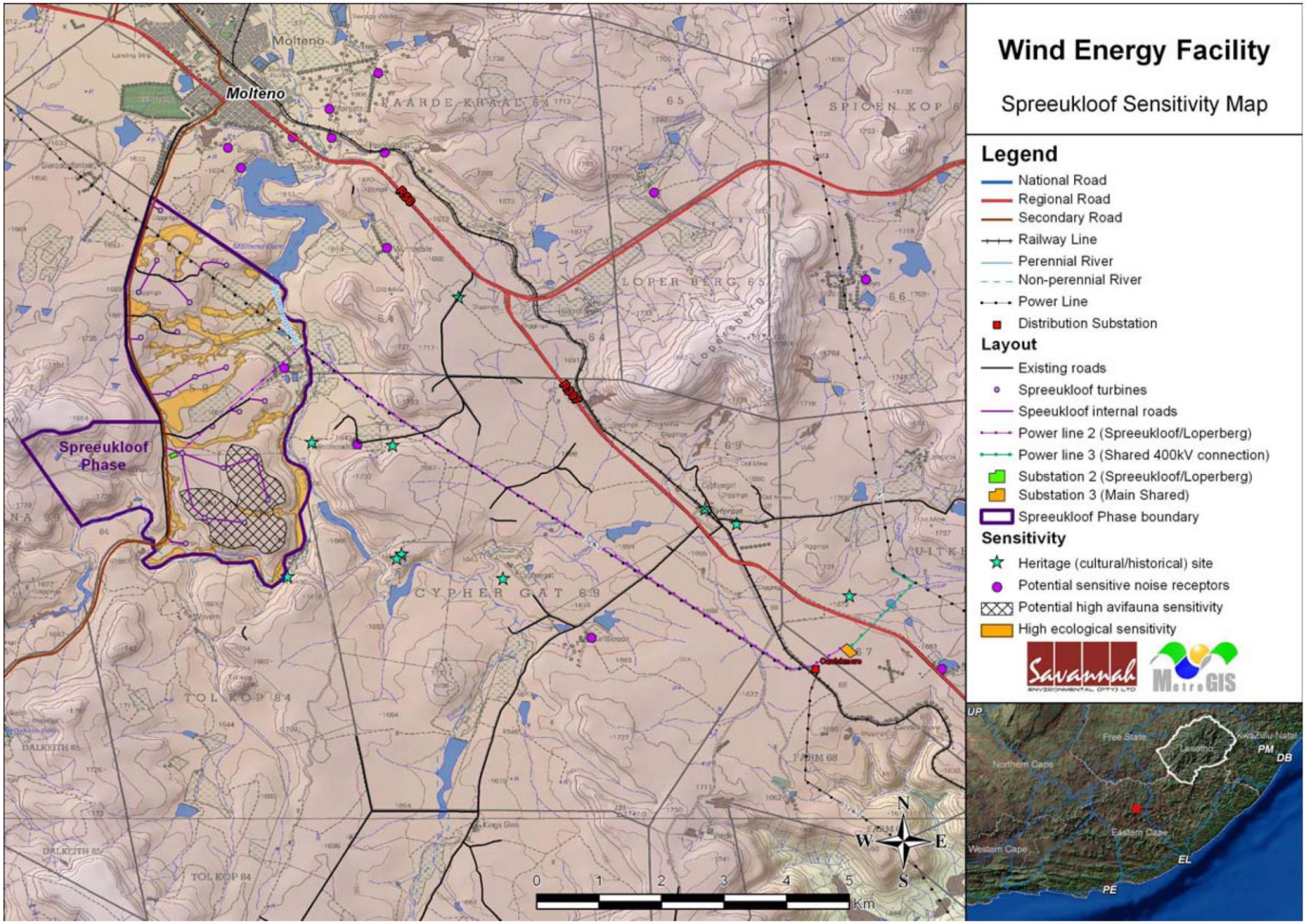

Figure 2.2: Spreeukloof split EIA layout overlain onto the identified sensitivities (2012) map.

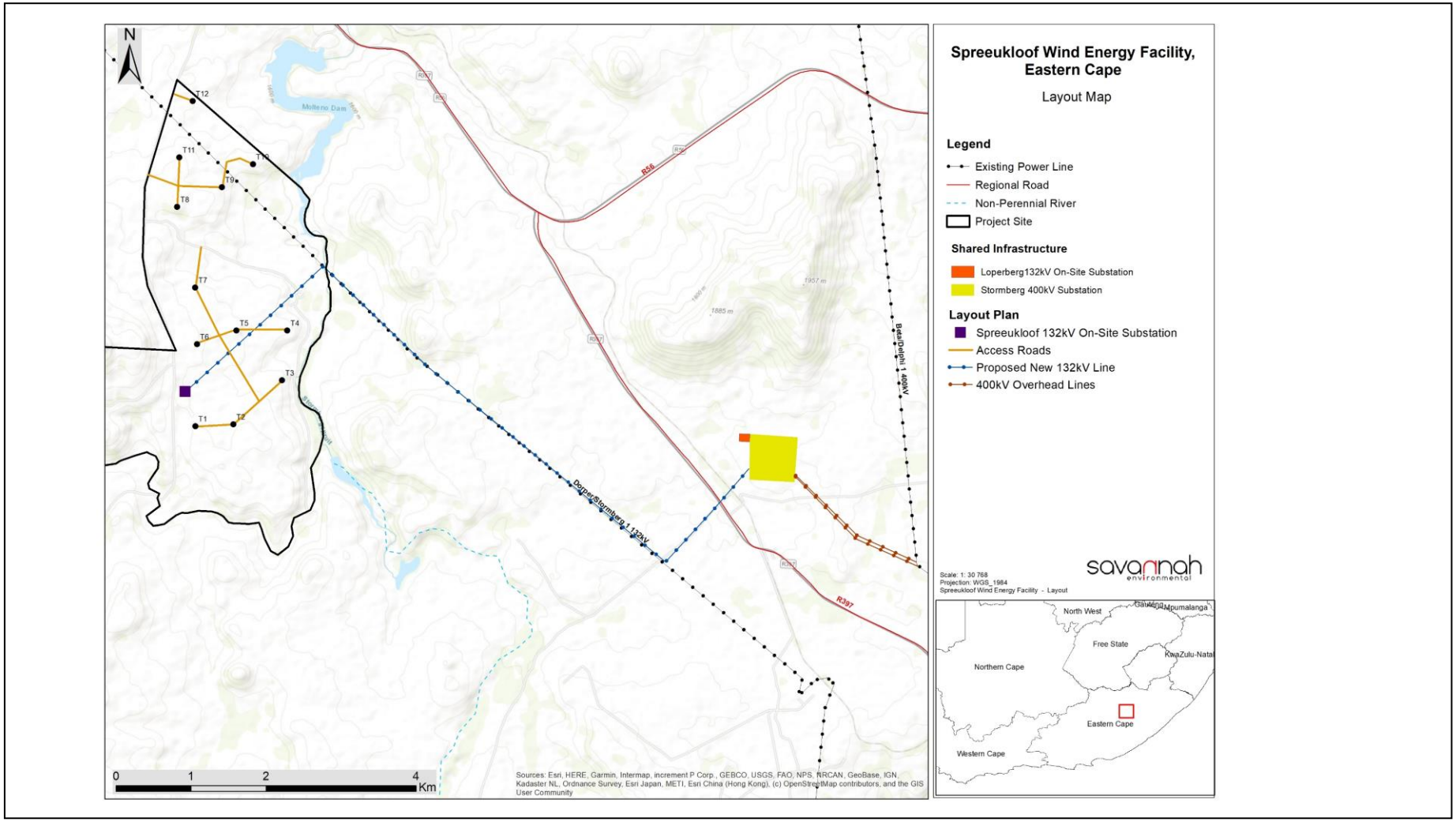

Figure 2.3: Wind farm layout showing the proposed amendment (2021) layout with reduced turbine number and revised turbine specifications (A3 Map included in Appendix I)

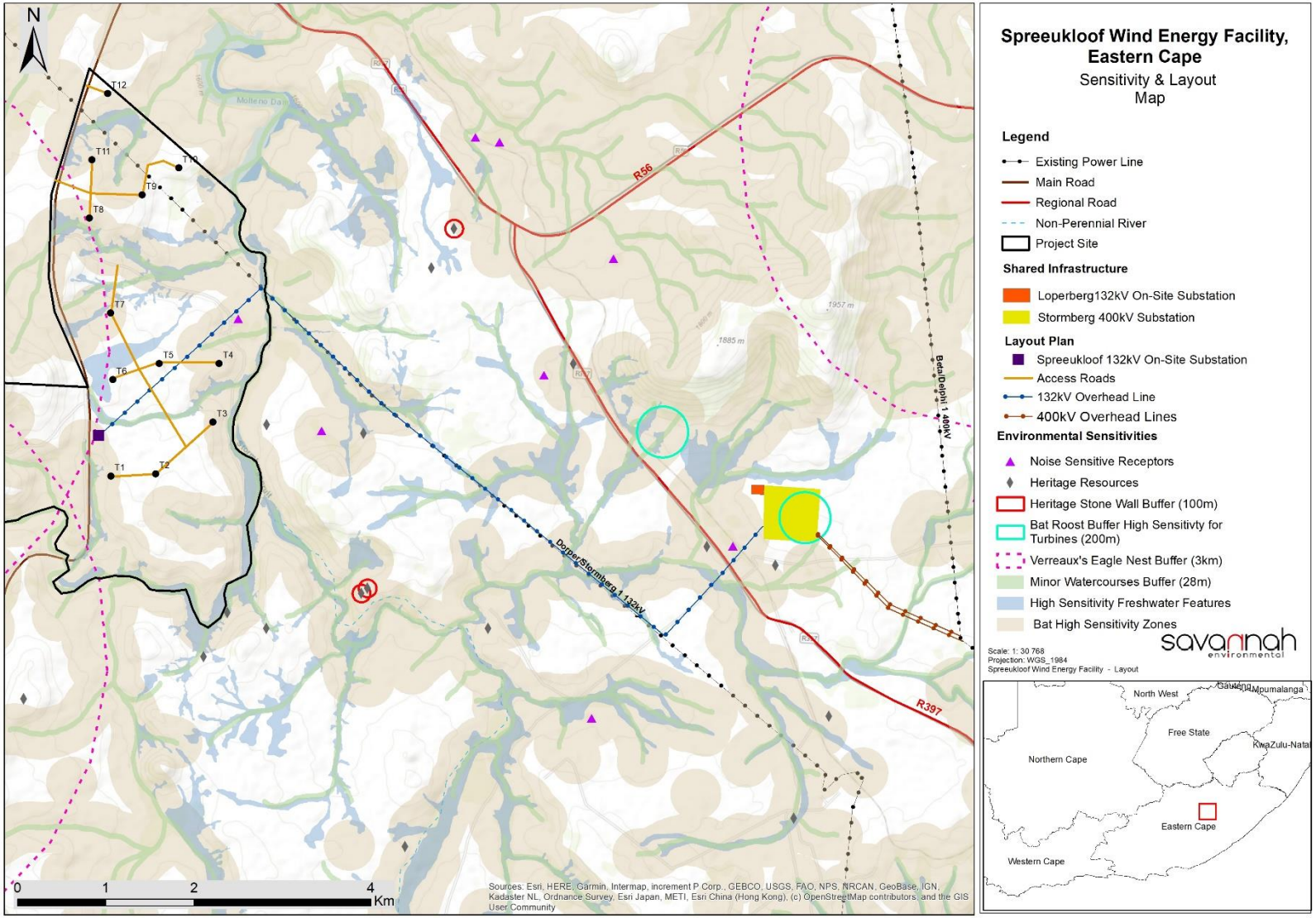

Figure 2.4: Wind farm sensitivity & layout showing the proposed amendment (2021) layout with reduced turbine number and revised turbine specifications overlain onto identified sensitivities as part of the amendment process (A3 Map included in Appendix I).

3. REASONS FOR THE REQUESTED AMENDMENTS

The following sections provide the reasons for the various amendments applied for from a technical perspective.

3.1. Amendment of the turbine specifications

Wind turbine generators are constantly under development to increase the potential energy output capacity per wind turbine. The more energy one turbine can produce, the fewer turbines are required to generate the authorised contracted capacity of the project.

The proposed project is intended to be bid into future rounds of the Department of Mineral Resources and Energy (DMRE) Renewable Energy Independent Power Producers Procurement (REIPPP) Programme or similar programmes under the promulgated IRP 2010–2030. Following the issuing of the EA for the project, there have been advancements to wind turbine technology with newer turbines becoming larger and more powerful. The turbines authorised in the EA are therefore not considered to be the most suitable in terms of production and economic considerations. Based on the technologies now available and the additional data collected onsite, it has been concluded by the applicant that improved turbines should be utilised for the facility to ensure optimisation of generation. In doing so the project will be:

i. **Optimising the generation efficiency** of the facility. Utilising the latest turbine technology ensures the facility is optimised from a generation perspective, and using the most efficient turbines possible.
ii. **Optimising the financial competitiveness** and longevity of the facility. Utilising the latest turbines ensures that the facility is able to effectively compete in the REIPPP programme and improves the facilities' financial performance during operation. This contributes to the competitive nature and success of the REIPPPP indirectly and therefore promotes the objectives of the REIPPPP. In addition, this will increase the overall competitiveness of the Project in the REIPPPP and will allow the applicant to charge a lower tariff for the energy produced by the Project – which would be for the benefit of all electricity consumers in SA.
iii. **Reducing the disturbance footprint** required for the placement of the turbines. This is due to the associated reduction in turbine numbers that accompany the request to amend the turbines specifications. As the turbines utilised are able to generate more energy per turbine, less turbines are utilised. This therefore requires less clearance as compared to the larger, authorised number of turbines.

The proposed amendments to the turbine specifications will therefore optimise generation and economic competitiveness while allowing for the avoidance of sensitivities on site and a reduction in the disturbance footprint. The amendment to the wind turbine specifications is not a listed activity and it will not trigger any new listed activities as the proposed amendment will fall within the originally authorised footprint and capacity of the facility.

3.2. A reduction in the authorised number of turbines from the currently authorised turbine number

In addition to the turbine specification amendment detailed above, the applicant is submitting an amendment request to reduce the number of authorised turbines as per the revised layout. Should the turbine specification amendment above be approved, the turbines utilised by the facility will have an increased generating capacity compared to what was available at the time of the initial EIA assessment.

Larger turbines require adjustments to turbine positions to cater for the minimum spacing that needs to be maintained between turbines for safety reasons and to ensure optimal operations. In order to not exceed the approved generating capacity of the facility, and to optimise the cost and disturbance footprint of the turbines by using less turbines, a reduced number is requested for approval which in turn requires an updated layout. This layout is therefore submitted as part of the amendment to reflect 12 revised turbine positions for the proposed facility.

It should be noted that the decrease in number of authorised wind turbines in all cases, is not a listed activity and will not trigger any new listed activities as the proposed amendment will fall within the originally authorised footprint of the facility.

A layout indicating the 12 turbine positions is provided in **Figure 2.3.** It must be noted that this amendment request is not for final approval of the facility layout as per the facility EA conditions. This will be undertaken following the detailed design for the project in accordance with the requirements of Condition 28 of the EA (dated 2 November 2012).

3.3. Update of the project description to reflect the revised co-ordinates of the 132kV grid connection line and substation locations as per the revised layout

A revised layout has been produced for the facility which considered the reduced number of turbines as per the amendments requested and detailed above. In addition, the current authorised connection point for the Spreeukloof facility is the shared substation 2 and 3 with Penhoek Wind Energy Facility (now known as Malabar Wind Energy Facility).

However, following review of the technical grid connections available and optimisation thereof on the basis of ongoing layout updates to both Malabar WEF and Loperberg WEF, a shared infrastructure substation connecting Malabar, Spreeukloof and Loperberg WEFs was deemed by the applicant to the optimal grid connection approach. Loperberg WEF is currently undergoing a layout revision towards moving the shared substation location, due to the technical connection requirements of Loperberg WEF and that of Eskom. As the substation into which Spreeukloof connects is therefore being moved, this amendment request is required to ensure that the authorised substation location specified in the EA accurately reflects the revised termination point for the Spreeukloof WEF.

In addition, given the terminating substation location has changed, the grid connection route thereto has is required to change accordingly. The revised grid connection route is therefore requested for specific inclusion into the EA to ensure that the amended grid connection route reflects accurately in the EA.

The resulting change in grid connection route and substation location will result in the reduction of the length of the powerline by ~1.5km, and will reduce the length of powerline required to cross delineated freshwater features. Please refer to Chapter 5 for a detailing of the impacts related to the proposed amendment. The revised grid connection route will now be located along the proposed access and internal road of the facility, allowing for easy access for maintenance and the reduction in maintenance roads required for the power line.

As a result, less potential for environmental impact on avifauna is incurred by the current proposed routing of the powerline. The movement of the infrastructure is therefore optimal from a technical connection perspective, whilst reducing the potential for environmental impact, and representing a shorter powerline.

The proposed amended substation location and grid connection route remain within the footprint of the facility as assessed in the EIA application (2010), and do not trigger any listed activities.

3.4. Amendment to the holder of the Environmental Authorisation.

Since issuance of the original EA for the Spreeukloof WEF facility in 2012, the commercial structure of the EA holder has changed and the Special Purpose Vehicle has since been renamed. The current holder as specified in the EA is therefore requested to be updated to reflect the correct SPV, namely Spreeukloof Wind Farm (Pty) Ltd. This amendment is required to ensure that the EA correctly specifies the holder and that the information it contains is up to date and accurate.

3.5. Amendment to the capacity of the Spreeukloof Wind Farm

The Spreeukloof WEF is currently authorised for 52.5MW generation utilising a maximum of 21 wind turbine units. Should the turbine specification and reduction of turbine number amendments detailed in Section 2.1 and 2.2 of this report be approved, this generation of 52.5MW will be completed by a reduced number of turbines (specifically 12), utilising a hub height of up to 120m and a rotor diameter of up to 176m. The benefit of reducing the turbine numbers is the concomitant reduction in footprint clearance required for establishment of access roads, trenching of low voltage cabling between turbines, and the physical footprint required for the establishment of a turbine. This in turn therefore reduces the quantum of habitat and vegetation clearance required for the same generating capacity.

Where it is technically feasible to increase the generator component of a wind turbine, in order to thereby generate more electricity from the operation thereof, a larger capacity turbine may be implemented. This would be possible with the implementation of the revised turbine specifications and layout detailed in Section 2.1 and 2.2 of this report. The applicant is therefore requesting an amendment of the authorised contracted capacity of the facility from 52.5MW to 64.4MW.

As the impact generated by a wind turbine is directly related to the specifications thereof (i.e. the turbine hub height and rotor diameter), improving the generating capacity of the turbine without altering the specifications will not incur any additional environmental impact, but rather result in an improved generating performance under identical environmental parameters.

Similarly, should the turbine specification and reduction of turbine number amendments detailed in Section 2.1 and 2.2 of this report be approved, the approved generating capacity would have been considered acceptable from an environmental impact perspective, having been assessed completely by specialist studies and contrasted in terms of the initially approved environmental parameters. By implication, the generating capacity utilising the increased turbine specifications has then considered the environmental impact (specifically that of bird and bats) to the amended turbine specifications.

The proponent is requesting the increase of the facility's generating capacity by increasing the capacity of the generator contained within the wind turbines, in order to optimise the facility and increase generation within the environmental parameters of this amendment application (should the amendments be approved). In doing so, the proponent will be increasing the generating capacity of an already authorised facility, having considered the environmental impacts related to the turbine specifications requested.

The benefits of doings so include:

i. **Optimising the generation efficiency** of the facility. Utilising the latest turbine technology ensures the facility is optimised from a generation perspective, and using the most efficient turbines possible.
ii. **Optimising the financial competitiveness** and longevity of the facility. Utilising the latest turbines ensures that the facility is able to effectively compete in the REIPPP programme and improves the facilities' financial performance during operation. This contributes to the competitive nature and success of the REIPPPP indirectly and therefore promotes the objectives of the REIPPPP. In addition, this will increase the overall competitiveness of the Project in the REIPPPP and will allow the applicant to charge a lower tariff for the energy produced by the Project – which would be for the benefit of all electricity consumers in SA.

The proposed amendment to increase the generating capacity by improving the turbine technology will therefore optimise generation and economic competitiveness while not altering the environmental impact. The amendment to the wind turbine specifications is not a listed activity and it will not trigger any new listed activities as the proposed amendment does not exceed any listed activity triggers for the generation of electricity.

3.6. Extension of the Environmental Authorisation (EA) validity by an additional two years

It is requested that the validity period of the EA be extended by an additional two (2) years. The Applicant intends to bid the Spreeukloof Wind Farm in future bidding window of the South African Government's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). To-date there have been five bidding windows in the REIPPPP. There have been a number of delays in the REIPPP process, with over 7-years delay between Round 4 and Round 5. Due to various socio-economic, political and legal reasons the fifth bid window – which was initially expected in 2015/2016 – has been delayed by some years and was now intended for late 2021, with the anticipated award of preferred bidder status uncertain at this point. The validity of the EA currently expires on 02 November 2022. Should the wind farm be successfully selected as a Preferred Bidder in the Round 5 of the REIPPPP, construction would be expected to commence in late 2022 or 2023 at the absolute earliest. The extension of the EA validity is therefore requested in order to enable the holder of the EA to (a) bid the project into upcoming round/s of the REIPPPPP and (b) commence construction in 2022/2023 (or later) should the projected be selected as a Preferred Bidder in REIPPPP.

This project was part of the Dorper Farm which was then splitted into 5 projects due to the REIPPP requirements, one of the project (Dorper Wind Farm) that was splitted together with the Spreeukloof project has already been constructed and its operational. The Wind farm falls within the Stormberg REDZ, the specialist undertaken in 2012 and during subsequent amendments confirmed that the site has no fatal flaws, and it has not change significantly since the issuing of the EA in 2012.

In addition, the updated bird and bat guidelines will apply since the comparative assessments that were conducted for this motivation took into consideration the updated birds and bat guidelines. Should the extension be granted, the EA will be current and under new guidelines, and will adhere to these updated guidelines. These will include but not limited to Verreaux eagle roosts.

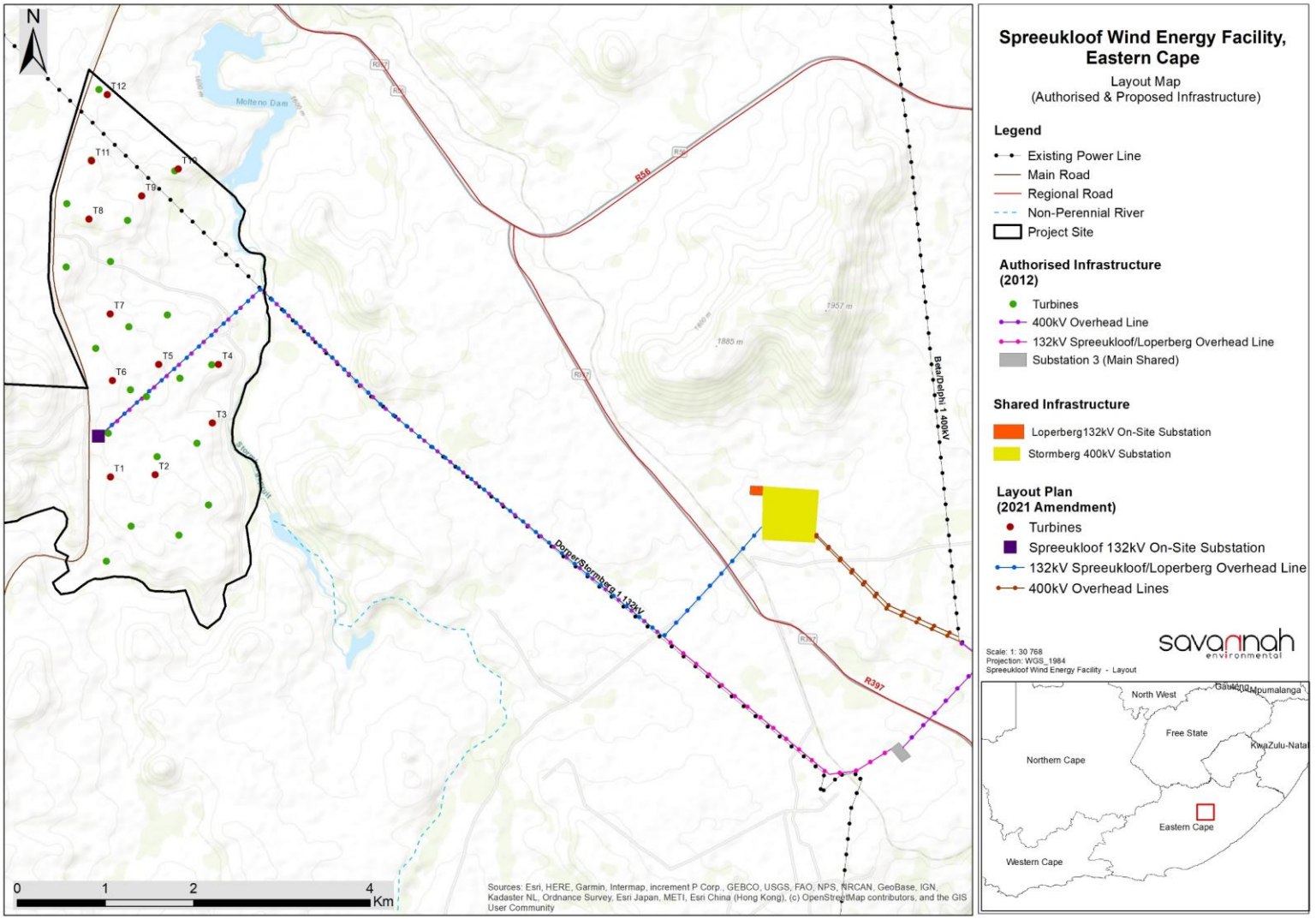

Figure 3.1: Wind farm map showing the previous routing of the power line (2012) solution between Loperberg, Malabar and Spreeukloof WEF and a new proposed powerline routing (2021) (A3 Map included in Appendix I).

4. CONSIDERATIONS IN TERMS OF THE REQUIREMENTS OF THE EIA REGULATIONS

In terms of Regulation 31 of the EIA Regulations 2014, as amended, an environmental authorisation may be amended by following the process in this Part (i.e. a Part 2 amendment) if it is expected that the amendment may result in an increased level or change in the nature of impact where such level or change in nature of impact was not:

a) Assessed and included in the initial application for environmental authorisation; or
b) Taken into consideration in the initial authorisation.

In this instance, the amended turbine specifications and associated layout were not considered in the initial authorisation. These amendments are however proposed within the originally assessed area for the wind energy facility. The change does not, on its own, constitute a listed or specified activity. Therefore, the application is made in terms of Regulation 31. The sections which follow provide:

i. an assessment of all impacts related to the proposed change;
ii. details of the advantages and disadvantages associated with the proposed change;
iii. measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and
iv. recommendations for any changes to the EMPr;

5. POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE EIA AS A RESULT OF THE PROPOSED AMENDMENTS

This application is considered to be a Part 2 amendment as contemplated in terms of Regulation 31 of the EIA Regulations (2014), as amended. In terms of Regulation 32(1)(a)(i), the following section provides an assessment of the impacts related to the proposed change. Understanding the nature of the proposed amendments and the impacts associated with the project (as assessed within the EIA), the following has been considered:

- Impacts on birds;
- Impacts on bats;
- Ecological and freshwater Impacts;
- Heritage Impacts;
- Visual impacts; and
- Noise impacts.

The proposed amendments are expected to have **no effect** on the findings of the Soils and Agricultural Potential Assessment or the Socio-economic Assessment undertaken as part of the EIA process as the project is located within the originally assessed site. Therefore, no specialist inputs for these aspects have been included. The potential for change in the significance and/or nature of impacts based on the proposed amendments as described within this motivation report is discussed below and is detailed in the specialists' assessment addendum letters and reports (as applicable) contained in **Appendix A – F.** For ease of reference, additional mitigation measures (i.e. those requested as part of the amendment specialist studies for this amendment application) have been underlined within the respective impacts assessment tables in this report, where applicable.

This section of the main report must be read together with the specialist reports contained in **Appendix A - F** in order for the reader to obtain a complete understanding of the proposed amendments and the implications thereof.

5.1. Impacts on avifauna

An assessment of the avifaunal impacts was conducted to determine the likely change in impact due to the proposed amendments (refer **Appendix A)**. The specialist considered that the turbine model is to be changed from a rotor diameter of 'up to 125m' to a rotor diameter of 'up to 176m' (rotor swept area from 42.5m to 187.5m above ground) to a hub height of 'up to 120m' and a rotor diameter of 'up to 176m' (rotor swept area 32m to 208m above ground (if maximum hub height is used, which may not necessarily be the case), together with the proposed layout changes.

Two aspects of the change in turbine model are relevant to assessing bird turbine collision risk: the change in height above ground at which the rotor will be and the change in overall size of rotor. The change in the number of turbines and facility layout affects the risk associated with the project as a result of the change in turbine specifications.

Change in height above ground of rotor

For the purposes of this analysis, the avifaunal specialist assumed the largest turbine model within the range applied for, as a worst-case scenario. The original authorised model would have had a rotor swept area from 57.5m to 182.5m above ground. The new proposed turbine would have a rotor swept area of 32m to 208m above ground if the maximum hub height is used. **Figure 5.1** below shows the two rotor swept area scenarios. The lower tip of the proposed new rotor drops by 15.5m. This is a slight disadvantage for avifauna as much of the typical bird flight is in the first 20-40m above the ground. Dropping the blade tip therefore slightly increases collision risk. Whichever hub height is used, the lower blade tip is not lowered below 30m above ground.

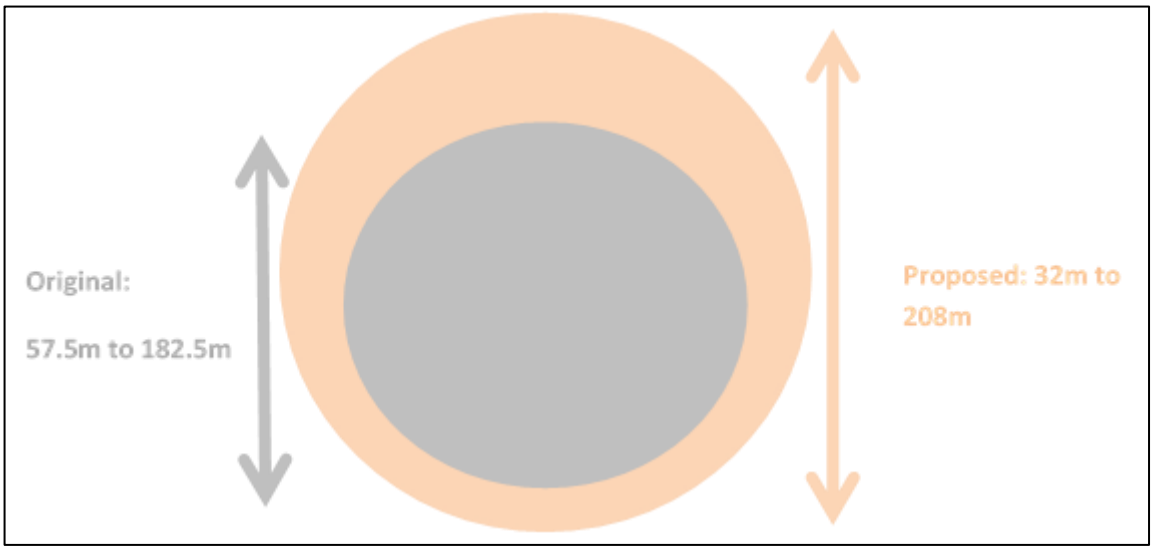

Figure 5.1: Indicative diagram of the original and proposed rotor swept areas. Not to scale.

Change in overall risk window presented by facility

The turbine model authorised originally had a maximum 125m rotor diameter and therefore presented a collision risk window of 12 271.85m² per turbine. The proposed change to a maximum 176m rotor diameter will increase the collision risk window presented by each turbine to 24 328.49m². This almost doubles the per-turbine collision risk window. The number of proposed turbines has however reduced from 21 to 12. The overall wind farm collision risk window would therefore increase from 257 708.85m² (21 x 12 271.85m²) to 291 941.88 (12 x 24 328.49m²). This represents an overall increase of 13.2%. This is also added to by the lower blade lowering.

In terms of layout, the original layout avoided all sensitive areas identified for avifauna (Avisense, 2010). More recently than the EIA, the pre-construction bird monitoring (WildSkies, 2014) recommended:

» No turbines or overhead power lines should be constructed within 250m of a wetland, dam, pan, or drainage line unless agreed to with the specialist in writing.
» No turbines should be placed within 250m from the edge of the main escarpment.

The new proposed amendment layout continues to avoid these areas. The proposed layout also avoids the necessary 3-kilometre Verreaux's Eagle nest buffers. Overall the new layout is better for avifauna as it uses almost half the number of turbines, with an associated decrease in the length of road, cabling and other associated infrastructure.

5.1.1. Comparative Assessment

The avifaunal specialist found that the Disturbance of birds during construction, and Habitat destruction during construction impacts have both reduced in significance under the amended scenario. In addition, disturbance during operations has also slightly reduced in significance. Operational mortality due to collision has however increased under the amended scenario, due primarily to the following:

» Two key species which were previously 'suspected' to potentially be susceptible to turbine collision (Verreaux's Eagle & Cape Vulture) have subsequently proven to actually be susceptible to turbine collision and have also been upgraded in regional and global (vulture) conservation status, indicating that they require more protection than thought previously. The numbers of roosting Cape Vultures at the nearby Donkerhoek roost are also on the increase in recent years which possibly increases the risk. Recommended buffers are however honoured by the revised layout, ensuring the implementation of appropriate mitigation.
» It is noted that the overall collision risk window presented by the wind farm has decreased slightly with the new proposed amendment and that this slightly offsets the above point.

It must be noted that the change in the significance ratings in the sections below is as a result of new information which has become available subsequent to the original assessment and not as a result of the proposed amendment.

The original mitigation recommendations for the project made by Avisense (2010) and WildSkies (2014) are largely still applicable and relevant. However, new mitigation measures were added due to the potential increase in significance of the risk of bird collision during operations as detailed above. Based on the information available now, the current assessment of the significance of impacts on avifauna is detailed below.

Construction phase

Impacts: Disturbance of birds during construction

Nature: Disturbance of birds during construction activities				
	Authorised		**Proposed amendments**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Short (1)	Short (1)	Short (1)	Short (1)
Magnitude	High (8)	Moderate (6)	Moderate (6)	Moderate (6)
Probability	Definite (5)	Definite (5)	Definite (5)	Definite (5)
Significance	**55 (Medium)**	**45 (Medium)**	**45 (Medium)**	**45 (Medium)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	Medium
Irreplaceable loss of resources?	Possible	Probably not	No	No
Can impacts be mitigated?	Yes		Yes	
Mitigation: See detail in 5.1.2 below.				
Cumulative impacts: The cumulative impact on birds could be high if all planned facilities in this area are constructed.				
Residual Risks: If all recommended mitigation in both original and current avifaunal assessments is adhered to there should be no residual				

impact.

This impact has reduced slightly in significance as compared to the original assessment. This is because we have learnt at operational wind farms around South Africa that most birds adapt to disturbance and recover quickly after construction. We have also implemented some avoidance by applying a no-go buffer of 3km around the most sensitive point receptors in this regard, i.e. the Verreaux's Eagle nest sites.

Impact: Habitat destruction during construction

Nature: Destruction of bird habitat				
	Authorised		**Proposed amendments**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)	Low (4)	Low (4)
Probability	Definite (5)	Definite (5)	Definite (5)	Definite (5)
Significance	**65 (Medium-High)**	**55 (Medium)**	**55 (Medium)**	**55 (Medium)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources?	Possible	Probably not	Yes	Yes
Can impacts be mitigated?	Yes		Yes	
Mitigation: See detail in 5.1.2 below.				
Cumulative impacts: The cumulative impact on birds could be high if all planned facilities in this area are constructed.				
Residual Risks: It is not possible to fully mitigate habitat destruction since a certain amount is inevitable. There will be a residual impact of medium significance.				

This impact has reduced slightly in significance as compared to the original assessment. This is because it has been learnt at operational wind farms around South Africa that most birds adapt to disturbance and recover quickly after construction. In addition, some avoidance has been implemented by applying a no-go buffer of 3km around the most sensitive point receptors in this regard, i.e. the Verreaux's Eagle nest sites.

Operational Phase

Impacts: Disturbance during operations

Nature: Disturbance of birds during operational phase				
	Authorised		**Proposed amendments**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Local (2)	Local (2)	Local (2)	Local (2)
Duration	Facility lifetime (4)	Facility lifetime (4)	Facility lifetime (4)	Facility lifetime (4)
Magnitude	Moderate (8)	Moderate (7)	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (2)
Significance	**56 (Medium)**	**52 (Medium)**	**Medium (48)**	**Low (20)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Medium	Medium
Irreplaceable loss of resources?	Possible	Possible	Possible	Possible
Can impacts be mitigated?	Slightly		No	
Mitigation:				

See detail in 5.1.2 below.
Cumulative impacts: The cumulative impact on birds could be high if all planned facilities in this area are constructed.
Residual Risks: If all recommended mitigation in both original and current avifaunal assessments is adhered to there should be no residual impact.

This impact has reduced slightly in significance as compared to the original assessment as described above in terms of new avoidance measures applied to the project.

Operational Impacts: Mortality during operational phase

***Nature:* Mortality of birds through collision with turbine blades and any overhead power line, and electrocution on power line.**				
	Authorised		**Proposed amendments**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Regional (3)	Local (2)	Regional (3)	Regional (3)
Duration	Facility lifetime (4)	Facility lifetime (4)	Facility lifetime (4)	Facility lifetime (4)
Magnitude	High (8)	Low (4)	High (8)	High (8)
Probability	Highly probable (4)	Probable (3)	Definite (5)	Probable (3)
Significance	**60 (Medium-High)**	**30 (Medium)**	**75 (High)**	**45 (Medium)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Low	Low	Low	Low
Irreplaceable loss of resources?	Yes	Possible	Yes	Yes
Can impacts be mitigated?	Yes		Not adequately	
Mitigation: See detail in 5.1.2 below.				
Cumulative impacts: The cumulative mortality impact on birds will be high in this area if all three of the planned wind farms are constructed.				
Residual Risks: There is a Medium residual impact after all mitigation has been applied as the risk of collisions cannot be entirely ruled out.				

This impact has increased in significance under the amended scenario assessment (but without change in the category after mitigation (i.e. medium)). The primary reasons for this are as follows:

» Two key species which were previously 'suspected' to potentially be susceptible to turbine collision (Verreaux's Eagle & Cape Vulture) have subsequently proven to actually be susceptible to turbine collision and have also been upgraded in regional and global (vulture) conservation status, indicating that they require more protection than thought previously. The numbers of roosting Cape Vultures at the nearby Donkerhoek roost are also on the increase in recent years which possibly increases the risk. Recommended buffers are however honoured by the revised layout, ensuring the implementation of appropriate mitigation.

It is noted that the overall collision risk window presented by the wind farm has also increased slightly with the new proposed amendment.

Cumulative Impacts

When the original avifaunal impact assessment was done (Avisense, 2010) and subsequent amendments, there were no other authorised wind farms in the vicinity (within 30km). The cumulative impacts of wind energy on birds was therefore of low significance. However, now there is the operational Dorper Wind Farm

to consider. The impacts of Dorper Wind Farm on birds have been of concern for two species in particular, the Verreaux's Eagle and Cape Vulture. These are also the two species most at risk at the new proposed wind farm. The cumulative impacts of wind energy on birds (and particularly Verreaux's Eagle and Cape Vulture was assessed as being of High significance prior to mitigation. The contribution of the Spreeukloof Wind Farm to this significance is rated Medium, since it represents about less than one quarter of all turbines operational or proposed in the area. It is essential that the mitigation measures recommended in this report are implemented effectively to ensure that the significance of this impact can be reduced to Medium or Low. These measures are detailed in Section 5.1.2 below.

Nature: Mortality of birds through collision with turbine blades and any overhead power line, and electrocution on power line.		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Facility lifetime (4)	Facility lifetime (4)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Probable (3)
Significance	**75 (High)**	**45 (Medium)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes - partially	
Mitigation: See detail in 5.1.2 below.		
Residual Risks: There is a Medium residual impact after all mitigation has been applied as the risk of collisions cannot be entirely ruled out.		

To summarise, the change between the original and current impact significance is as follows:

Construction phase:

- Disturbance: Slight change downwards
- Habitat destruction: Slight change downwards

Operations phase:

- Disturbance: Slight change downwards
- Mortality: Slight change upwards with implementation of mitigation measures (with no change in impact category)

Cumulative effects:

- Mortality of birds through collision (cumulative): rated medium significance following mitigation (not rated in the original assessment).

5.1.2. Mitigation measures

The original mitigation recommendations made by Avisense (2010) and WildSkies (2014) are largely still applicable and relevant. However there is a need to significantly add to these with new measures, due to the increase in significance of the risk of bird collision with turbines pre-mitigation from Medium-High to High.

The recommended additional mitigation measures are described below. These mitigation measures must be included in the construction and operations Environmental Management Plan (EMP) for the project.

» A 3km radius circular no-go buffer must be implemented around each of the known Verreaux's Eagle nests. No new overhead infrastructure may be constructed within these areas.
» Whichever hub height is used, the lower blade tip not be lowered below 30m above ground.
» An avifaunal walk through must be conducted by a suitably qualified and independent ornithologist for all components of the final facility layout to ensure that all avifaunal aspects have been adequately catered for. If WildSkies does this we believe it can be done desktop due to our high level of experience and familiarity with the site.
» Minimising the length of any new overhead power line built. None of the low voltage line connecting turbines should be above ground. Only the grid connection power line may be above ground. The internal cables should be buried in trenches following roads (i.e. not on their own servitude through the veld).
» Any above ground power line must be fitted with bird flight diverters to mitigate collision risk and pylons must be built on Eskom approved vulture friendly designs. This applies to the full length of line. This applies to the full length of above ground line.
» At other operational wind farms it is suspected that ground burrowing small mammals such as Ground Squirrel found more favourable burrowing conditions along new road and hard stand verges on site, which resulted in an inflated prey base for eagles close to turbines, and consequent higher turbine collision risk. It is essential that the new wind farm does not create favourable conditions for such mammals in high risk areas. We therefore recommend that within the first year of operations a full assessment of this aspect be made by the ornithologist contracted for post construction monitoring. If such burrowing is found case specific solutions to exclude these mammals from areas close to turbines will need to be developed and implemented by the wind farm.
» A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site prior to the Commercial Operation Date (COD). This policy should form an annexure of the operational EMP for the facility. This policy should identify most importantly the number of bird fatalities of priority species which will trigger a management response, appropriate responses, and time lines for such a response. Fatalities of priority bird species are usually rare events (but with very high consequence) and it is difficult to analyse trends or statistics related to these fatalities as they occur. It is therefore important to have a threshold policy in place to assist management.
» A 'Cape Vulture Food Management Programme' must be implemented on site to ensure all dead livestock/wildlife on site are removed as soon as possible and made unavailable to vultures for feeding. This will also need to be implemented at any nearby operational facilities, so that a larger area is covered. This programme will reduce the amount of available vulture food on site and reduce vulture-turbine collision risk. This programme will require the deployment of a dedicated (i.e. no other tasks) and adequately resourced (transport, binoculars, GPS, cameras, training) team of staff to patrol the full site during all daylight hours. The co-operation of landowners will also be essential to ensure that reported carcasses are disposed of effectively. This programme must be operational by the time the first turbine blades are turning on site and should not wait for COD. A full detailed method statement or protocol must be designed by an ornithologist prior to COD. This protocol must be included in the EMP during operations.
» An observer led turbine Shutdown on Demand (SDOD) programme must be implemented at the facility from the start of operations (COD). This programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations. The observers must detect

incoming priority bird species (Cape Vulture, Verreaux's Eagle & others to be identified when the programme is fully designed), track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine. A full detailed method statement or protocol must be designed by an ornithologist prior to COD. This protocol must be included in the EMP during operations.

- The facility must be monitored once operational in accordance with the most recent version of the best practice guidelines available at the time (Jenkins et al, 2015). A minimum of two years of monitoring must be completed, although if significant impacts are detected this will need to be extended. Fatality estimates should continue for the full life span of the facility. The results of this monitoring should feed into the adaptive management plan for the facility.
- The local population of Verreaux's Eagle must be monitored for the full lifespan of the wind farm to ensure that any population level impacts are measured. This will require 2-3 visits to each of the 9 known nests (and any new ones subsequently found) during breeding season each year by a suitably qualified independent ornithologist. This will measure breeding status and productivity and the overall health of this local population.
- The Donkerhoek Cape Vulture roost must be surveyed monthly once the wind farm is operational for at least the first two years of operations, in order to better understand trends in vulture numbers at the roost and how this relates to collision risk at the wind farm. During the first two years of operations, wind farm staff must be trained and equipped to do this work so that they can continue with the monitoring beyond the first two years if deemed necessary by the avifaunal specialist based on the first two years' findings.
- If the above mitigation measures do not adequately mitigate the risk and bird fatalities still exceed the identified thresholds these residual impacts will need to be off-set. The facility will need to address other sources of mortality of priority species in a measurable way (according to best practice) so as to compensate for residual effects on the facility itself.

5.1.3. Conclusion

The avifaunal specialist findings with respect to the proposed amendment were as follows:

- The proposed amendment to the facility layout makes a slight positive difference to risk to birds, although not sufficient to alter the original impact assessment findings.
- The proposed amendment to power line routing is acceptable and makes little difference to the risk to avifauna.
- The remaining amendments are administrative of nature and make no difference for avifauna. These amendments are therefore all acceptable.
- The proposed amendment to the turbine model increases the per-turbine collision risk window but this is offset to some extent by the reduced number of turbines. The collision risk window of the wind farm as a whole is increased (by 13.2%).
- New information which has become available subsequent to the original assessment has made a significant difference to the rating of the impact of mortality of birds through collision with turbines. This impact has increased in significance from Medium-High to High prior to the implementation of mitigation measures under the amended scenario assessment. Two key species which were previously 'suspected' to potentially be susceptible to turbine collision (Verreaux's Eagle & Cape Vulture) have subsequently proven to actually be susceptible to turbine collision at operational wind farms and have also been upgraded in conservation status (Verreaux's Eagle from Least Concern to Vulnerable regionally; Cape Vulture from Vulnerable to Endangered regionally and globally),

indicating that they require more protection than thought previously. This risk will need to be mitigated proactively from the start of operations (and earlier in some cases as described below).

» The cumulative impact of wind energy on birds in this area is now of High significance, mitigated to Medium if the recommendations of this report are adhered to.

The specialist further noted that the avifaunal assessment for the amendment application compiled with the knowledge that the project already has an environmental authorisation to go ahead in its original form and as amended subsequently), and that the new proposed facility is an improvement on the old facility in terms of risks to birds (since the number of turbines has halved). This assessment considers all new avifaunal information (unrelated to the actual amended facility amendment) that we are aware of, in order to be thorough. It is the new information which has resulted in a change to the significance of bird collision with turbines, and not the proposed amendment to the infrastructure. If the mitigation measures stipulated in this report are adhered to the proposed amendment is considered acceptable from an avifaunal perspective.

Considering the findings of the assessment, it was concluded that the original mitigation recommendations made by Avisense (2010) and WildSkies (2014) are largely still applicable and relevant. However, there was a need to significantly add to these with new measures, due to the increase in significance of the risk of bird collision with turbines from Medium-High to High. Additional mitigation measures are added and must be included in the construction and operations Environmental Management Plan (EMP) for the project. On the condition these mitigation measures are implemented, the amendment was supported from an avifaunal specialist perspective.

5.2. Impacts on bats

The core issue relevant to the bat specialist assessment (refer **Appendix B**) is the impact to bats due to increasing the size of the turbines and the decreasing height of the lower blade tip at the Spreeukloof WEF. All other amendments are either administrative in nature or do not significantly change impacts to bats and, as such, do not change the assessment or outcomes of the bat assessment. The proposed amendment to the turbines at the wind farm would result in a greater per turbine rotor swept area and a minimum blade tip height of 20 m, hence a potentially greater likelihood bats would collide with turbine blades or experience barotrauma. The total rotor swept area for the WEF will also increase, potentially further increasing the likelihood of collision overall. Currently, the maximum rotor swept area for each turbine is 12,272 m^2 and based on the amendment being applied for, this would increase to up to 24,328 m^2 (a 98% increase). The total combined rotor swept area for the currently approved turbines are 257,712 m2 and for the proposed amendment the total combined rotor swept area would be 364,920 m^2 (ca. 42 % increase).

A site walkthrough was conducted by Arcus in May 2021 (autumn) to confirm and update sensitivity areas important for bats. All important features as well as potential turbine locations were visited, and sensitivity rating assessed. Some features such as drainage lines and reservoirs were seen to be absent or not in use and, as such, buffers were altered or removed.

Two abandoned mines were also observed on a neighbouring farm, which could be important seasonal roosts for migratory species (such as the Natal Long-fingered bat) or night roosts. No bats were observed entering or leaving the mines although this could change throughout the year. As such, these caves have been buffered by 200 m (**Figure 5.2)**. Seven bat species have been confirmed on the four sites initially authorised from the pre-construction monitoring study with four being present on the Spreeukloof site: The

Egyptian free-tailed bat, Cape serotine, Natal Long-fingered bat, Long-tailed serotine. Three of these species are at high risk for turbine collisions or while the other one is at medium risk **(Table 5.1)**.

Table 5.1: Bat species confirmed from Acoustic Monitoring within the study area

Species	Conservation Status		Likely Risk of Impact
	National	International	
Egyptian free-tailed bat *Tadarida aegyptiaca*	Least Concern	Least Concern	**High**
Natal long-fingered bat *Miniopterus natalensis*	Near Threatened	Least Concern	**High**
Cape serotine *Neoromicia capensis*	Least Concern	Least Concern	**High**
Long-tailed serotine *Eptesicus hottentotus*	Least Concern	Least Concern	**Medium**

The sensitivity map determined for the amendment by the bat specialist is provided below (refer **Figure 5.2**), indicating the delineation of sensitive areas following fieldwork and assessment by the specialist.

5.2.1. Comparative Assessment

The amendments entail decreasing the number of turbines and using taller turbines with a greater rotor diameter and a change in location of the associated substation and overhead line. The implications of these amendments will vary for low-flying bat species and high-flying bat species. Of the impacts identified in the Final Pre-Construction Bat Monitoring Report of the authorised Spreeukloof WEF (by IWS, 2017), mortality of species due to collision with turbine blades or due to barotrauma and cumulative impacts has been reassessed. The significance of all other identified impacts on bats associated with the development will remain the same. The potential significance of bat mortality while foraging was rated by Inkululeko Wildlife Services (2017) as medium-high before mitigation and low after mitigation while significance of bat mortality due to migration was medium before mitigation and low after mitigation. Cumulative impacts associated with bats were rated as medium before mitigation and low after mitigation. The assessment is based on field data collected between December 2015 and December 2016 during the pre-construction monitoring. Impacts related to the change of the substation position and associated grid connection would be limited to collision with transmission lines by larger frugivorous bats. Since no evidence of any frugivorous bats were found on site and they are unlikely to occur in the area, these impacts will not significantly change.

The first key point to consider is the overall dimensions of the authorised rotor swept area vs. the new overall rotor swept area. In terms of the Environmental Authorisation received for Spreeukloof WEF, the wind farm was authorised for 21 turbines with a maximum rotor diameter of 125 m. This translates into a total authorised rotor swept area of 257,712 m2. Taking into account the reduced number of turbines proposed for the facility in this amendment, the total rotor swept area will be 364,920 m2. As such the new overall rotor swept area, considering the reduced number of turbines, would increase by ca. 42 %.

The increase in the rotor diameter will be negative for high flying bats species, particularly to free-tailed bats, which are present on site and have fatally collided with turbines in the Eastern Cape. This is because taller turbines are predicted to kill more bats. However, unpublished data from numerous wind farms in South Africa show bat activity generally decreases with height and it is unlikely that the upper tip height increase would result in a significant difference in fatality for this group of bats. Given the lower activity recorded at height, this would not change the previous assessments findings. However, the decrease in the lower tip

height will be negative for low-flying bats as the blade swept area will encroach into their lower flight zone, potentially increasing the likelihood of collisions.

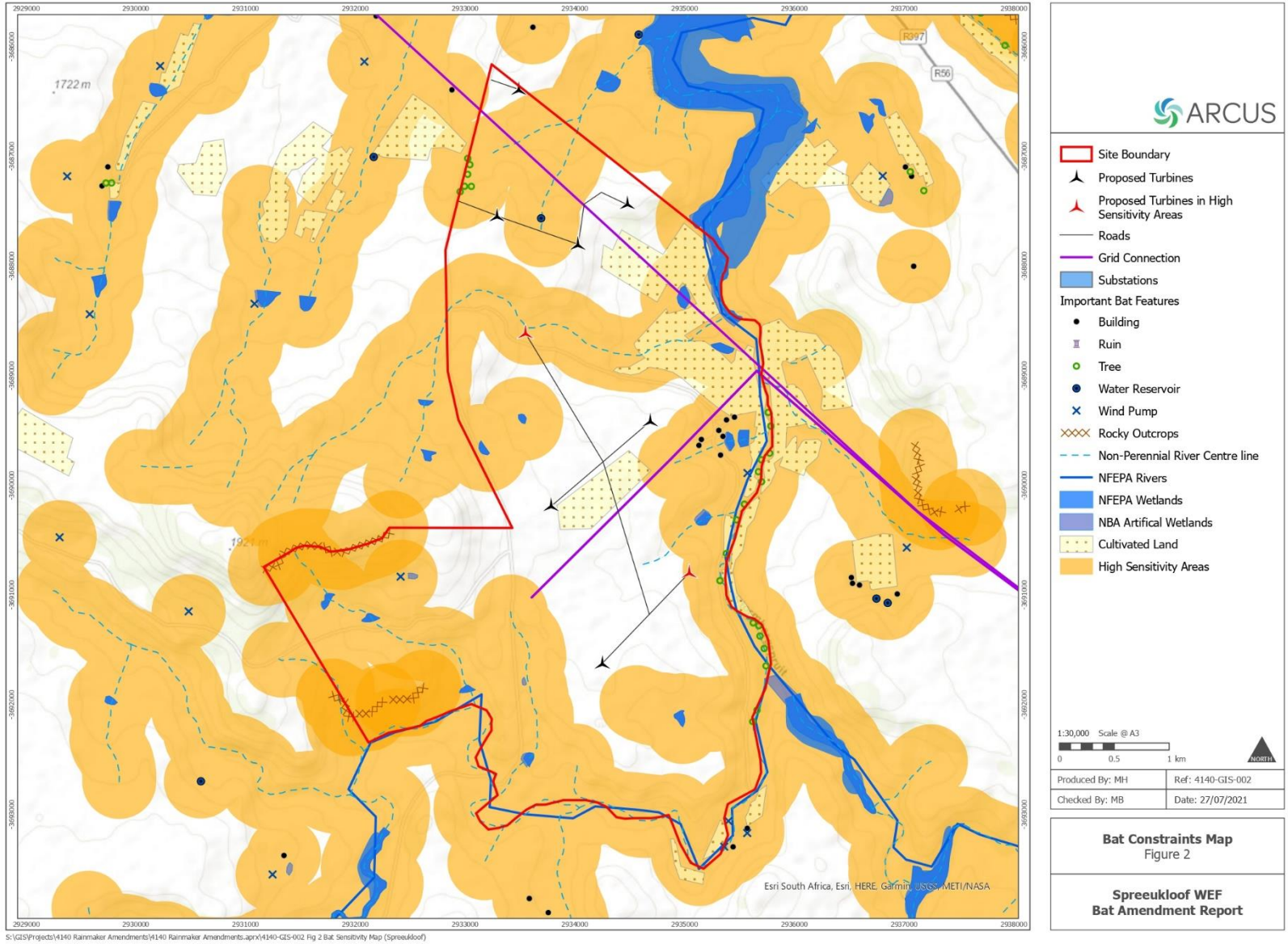

Figure 5.2: Bat sensitivity map for the amended scenario.

The specialist have created a sensitivity map using the National Geo-Spatial Information Topographic dataset (2015), the National Freshwater Ecosystems Priority Areas database (2011) and the field trip conducted by Arcus in May 2021 enabled these sensitivities to be assessed and refined into an updated sensitivity map. The updated sensitivity map (**Figure 5.2**) shows that 2 proposed turbines fall within bat high sensitivity areas. It is recommended that these turbine positions be adjusted during the design phase in order to avoid these sensitive areas. It is recommended that these turbine positions be adjusted during the design phase in order to avoid these sensitive areas. All buffers are to blade tip. Should it not be possible to move these turbines, then more stringent mitigation measures, as set out in the original pre-construction bat impact assessment report (IWS, 2017), which would include curtailment, would need to be implemented as soon as turbines are erected. Such curtailment would include:

- a turbine cut-in wind speed of 8 m/s (approximately 75% of bat activity occurs below this wind speed) at hub-height is recommended for curtailment of these turbines in the following times of year and the following times of night:
    - If temp >= 9°C; AND
    - February and March from sunset to sunrise; AND
    - January, April, September, October, November and December from sunset for 2.5 hours.

Should important features, including wind pumps and water reservoirs be removed or covered, this curtailment would not apply and can be removed.

A review of the previously assessed impacts based on the new project description was completed (**Table 5.2**). The significance rating of these impacts does not change based on the updated project description under the amended scenario.

Table 5.2: Summary of relevant impact assessment and indication of changes due to the proposed development.

Phase	Impact	Significance with mitigation will change due to proposed development (Y/N)	Reason for No Change
Construction	Roost Disturbance	N	Construction area will not significantly impact roosts or potential roost features nearby
	Roost Destruction	N	Construction area will not significantly impact roosts or potential roost features nearby
	Fragmentation of Habitat	N	Construction footprint is not large enough to significantly change environment for bats
Operation	Light Pollution	N	New structures will not emit enough light to significantly change bat foraging behaviour
	Bat Mortality due to Collision with Transmission Lines	N	Frugivorous bats are unlikely to occur on site and collisions are unlikely to occur

The specialist is in agreement with the mitigation measures and most of the bat sensitivities in the bat sensitivity map, which contained buffers of several important bat features, identified by Inkululeko Wildlife Services (2017). In terms of impacts being identified, only mortality of species due to collision with turbine blades or barotrauma during foraging and cumulative impacts are being considered relevant for this

assessment, as all other impacts and significance values remain unaffected and therefore unaltered by the proposed amendments. Mortality due to collision with turbines blades or barotrauma during migration was not assessed in the original pre-construction monitoring report, but is relevant and assessed here. The significance of the impact would be dependent on the size of the turbines chosen. The assessments here are based on the scenario where turbines of the maximum dimensions being applied for are used. This would increase risk to high flying species such as free-tailed bats and low flying species, as the turbine blades would extend higher into the air and lower to the ground.

Impact Assessment Table for Mortality of Species due to Collision with Turbine Blades or Barotrauma During Foraging at Spreeukloof WEF (under the amended scenario)

Nature of impact: Mortality of bats due to collision with turbine blades or barotrauma caused by turbine operation while foraging.				
	Authorised		**Proposed amendment**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	Study Area (2)	Study Area (2)	Medium (3)	Low (2)
Duration	Permanent (4)	Permanent (4)	Long Term (4)	Long Term (3)
Magnitude	High (3)	Medium (2)	Very High (9)	Low (4)
Probability	Definite (4)	Probable (2)	Highly Probable (4)	Probable (2)
Significance	**High (36)**	**Low (16)**	**High (68)**	**Low (18)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	-	-	Irreversible	Irreversible
Irreplaceable loss of resources?	-	-	Yes	Yes
Can impacts be mitigated?	-	-	Yes	Yes, if all WEFs adhere to mitigations

Mitigation:

» All currently proposed mitigation measures proposed in the Spreeukloof WEF EMPr / EA must be adhered to. This includes adhering to the updated sensitivity map (**Figure 5.2**) which will require repositioning 2 turbines that intrude into high sensitivity buffers. These buffers are regarded as high sensitivity areas for turbine components only, and other infrastructure (roads, cables etc) are permissible. These areas include 200m around all cliff lines potential roosts and all other important bat features. Should important features, including wind pumps and water reservoirs be removed or covered, these buffers would not apply and can be removed.

» Should it not be possible to move these turbines, then more stringent mitigation measures set out in the original pre-construction bat impact assessment report, which would include curtailment, would need to be implemented as soon as turbines are erected. This would include a turbine cut-in speed of 8 m/s at hub-height for these turbines in February and March from sunset to sunrise and in January, April, September, October, November and December from sunset for 2.5 hours, and only when temperatures are 9 °C or higher. The sunset and sunrise times to be adjusted each month according to the seasonal changes in these times.

» In the event that turbines can be micro-sited, then a bat specialist must map the final turbine layout before micro-siting and assess whether all turbines are appropriately sited in such a way that their blades do not encroach into any bat sensitive buffers.

» A minimum buffer to blade tip for all bat buffer zones is required. Additionally, a full operational phase monitoring campaign, inclusive of fatality monitoring and estimates, is to commence as soon as the wind turbines are erected, and in accordance with latest version of the bat monitoring guidelines. This is to take place for the entire Spreeukloof WEF. Based on results from this monitoring campaign, should the estimated bat fatalities for the entire Spreeukloof WEF exceed the threshold of 31 bats per annum, then strict curtailment measures will need to be implemented – to be defined and monitored by an appropriate bat specialist.

» All mitigation measures to protect bats proposed in the EMPr must be adhered to.

Additional mitigation measures

» The impacts presented can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point). The lowest tip should not encroach any lower than 30 m above ground, in order to reduce the risk of bat mortalities from reaching the specified estimated threshold limits of 31 bats per annum.

» Apply blade feathering to prevent unnecessary free-wheeling of blades below generation cut-in speed at operation commencement.

Residual Risks: Residual impacts may still remain even if the high sensitivity buffers are adhered to and by using turbines of an appropriate size to limit bat fatalities. Bat fatalities are a widely occurring phenomenon having been reported across Europe, North America, Central America, Brazil, India, Australia and South Africa (Baerwald and Barclay 2011; Barros et al. 2015; Hein and Schirmacher 2016; Kumar et al. 2013; Rodríguez-Durán and Feliciano-Robles 2015; Rydell et al. 2010). Furthermore, evidence has shown that pre-construction monitoring data may not be able to adequately predict post-construction fatality risk (Hein et al. 2013), and that bats actively investigate and forge around turbines (Cryan et al. 2014; Foo et al. 2017). This suggests that there may still be fatality impacts. Residual impacts can likely be reduced if curtailment is used when appropriate and this has been shown to be one of the most effective mitigation measures (Arnett and May 2016).

Impact Assessment Table for Mortality of Species due to Collision with Turbine Blades or Barotrauma During Migration at Spreeukloof WEF (under the amended scenario)

Nature of impact: Mortality of bats due to collision with turbine blades or barotrauma caused by turbine operation while migrating.

	Authorised		**Proposed amendment**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	N/A	N/A	High (3)	Low (2)
Duration	N/A	N/A	Long Term (4)	Long Term (4)
Magnitude	N/A	N/A	Moderate (6)	Minor (3)
Probability	N/A	N/A	Probable (3)	Improbable (2)
Significance	N/A	N/A	**Medium (39)**	**Low (18)**
Status (positive or negative)	N/A	N/A	Negative	Negative
Reversibility	-	-	Irreversible	Irreversible
Irreplaceable loss of resources?	-	-	Yes	Yes
Can impacts be mitigated?	-	-	Yes	-

Mitigation:

» All currently proposed mitigation measures proposed in the Spreeukloof WEF EMPr / EA must be adhered to. This includes adhering to the updated sensitivity map (**Figure 5.2**) which will require repositioning 2 turbines that intrude into high sensitivity buffers. These buffers are regarded as high sensitivity areas for turbine components only, and other infrastructure (roads, cables etc) are permissible. These areas include 200m around all cliff lines potential roosts and all other important bat features. Should important features, including (such as wind pumps andor water reservoirs) be removed or covered, these buffers would not apply and can be removed.

» Should it not be possible to move these turbines, then more stringent mitigation measures set out in the original pre-construction bat impact assessment report, which would include curtailment, would need to be implemented as soon as turbines are erected. This would include a turbine cut-in speed of 8 m/s at hub-height for these turbines in February and March from sunset to sunrise and in January, April, September, October,

November and December from sunset for 2.5 hours, and only when temperatures are 9 °C or higher. The sunset and sunrise times to be adjusted each month according to the seasonal changes in these times.

- In the event that turbines can be micro-sited, then a bat specialist must map the final turbine layout before micro-siting and assess whether all turbines are appropriately sited in such a way that their blades do not encroach into any bat sensitive buffers.
- A minimum buffer to blade tip for all bat buffer zones is required. Additionally, a full operational phase monitoring campaign, inclusive of fatality monitoring and estimates, is to commence as soon as the wind turbines are erected, and in accordance with latest version of the bat monitoring guidelines. This is to take place for the entire Spreeukloof WEF. Based on results from this monitoring campaign, should the estimated bat fatalities for the entire Spreeukloof WEF exceed the threshold of 69 bats per annum, then strict curtailment measures will need to be implemented – to be defined and monitored by an appropriate bat specialist.
- All mitigation measures to protect bats proposed in the EMPr must be adhered to.

Additional mitigation measures

- The impacts presented can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point). The lowest tip should not encroach any lower than 30 m above ground, in order to reduce the risk of bat mortalities from reaching the specified estimated threshold limits of 69 bats per annum.
- Apply blade feathering to prevent unnecessary free-wheeling of blades below generation cut-in speed at operation commencement.

Residual Impacts:

Residual impacts may still remain even if the high sensitivity buffers are adhered to and by using turbines of an appropriate size to limit bat fatalities. Bat fatalities are a widely occurring phenomenon having been reported across Europe, North America, Central America, Brazil, India, Australia and South Africa (Baerwald and Barclay 2011; Barros et al. 2015; Hein and Schirmacher 2016; Kumar et al. 2013; Rodríguez-Durán and Feliciano-Robles 2015; Rydell et al. 2010). Furthermore, evidence has shown that pre-construction monitoring data may not be able to adequately predict post-construction fatality risk (Hein et al. 2013), and that bats actively investigate and forge around turbines (Cryan et al. 2014; Foo et al. 2017). This suggests that there may still be fatality impacts. Residual impacts can likely be reduced if curtailment is used when appropriate and this has been shown to be one of the most effective mitigation measures (Arnett and May 2016).

Cumulative Impact Assessment (under the amended scenario)

Cumulative impacts were rated as medium before mitigation and low after mitigation in the original bat impact assessment report in accordance with the original impact assessment methodology (Inkululeko Wildlife Services, 2017, Figure 1) and has been reassessed below using the impact assessment criteria provided by Savannah Environmental. Currently, there is one operational WEF within the cumulative impact area of a 50km radius (Dorper Wind Energy Facility) and at least five renewable energy facilities (all of which are for Wind Energy Facilities) planned or approved, within this area based on the Department of Environmental Affairs Renewable Energy Development Database Quarter 4, 2020.

It is important to consider cumulative impacts across the entire scale where potentially affected animals are likely to move, especially mobile animals like bats. Impacts at a local scale could have negative consequences at larger scales if the movement between distant populations is impacted (Lehnert et al. 2014; Voigt et al. 2012). For example, Lehnert et al. (2014) demonstrated that among Noctule bats collected beneath wind turbines in eastern Germany, 28 % originated from distant populations in the Northern and North-eastern parts of Europe. This is particularly relevant to bats that migrate. One migratory bat was recorded on the site but relatively seldom, so a larger cumulative impact area was not considered at this stage.

The cumulative impacts could be lower for species that do not migrate over such large distances or resident species that are not known to migrate. Three of the four species recorded during the pre-construction monitoring do not migrate over such large distances. The sphere of the cumulative impact would then likely be restricted to the home ranges and foraging distances of different species, which can range from 1 km to at least 15 km for some insectivorous bats (Jacobs and Barclay 2009; Serra-Cobo and Sanz-Trullen 1998) and up to at least 24 km for some fruit bats (Jacobsen et al. 1986).

Cumulative impacts on bats could increase as new facilities are constructed (Kunz et al. 2007) but are difficult to accurately predict or assess without baseline data on bat population size and demographics (Arnett et al. 2011; Kunz et al. 2007) and these data are lacking for many South African bat species. It is possible that cumulative impacts could be mitigated with the appropriate measures applied to wind farm design and operation. Cumulative impacts could result in declines in populations of even those species of bats currently listed as Least Concern, if they happen to be more susceptible to mortality from wind turbines (e.g. high-flying open air foragers such as free-tailed and fruit bats) even if the appropriate mitigation measures are applied. Further research into the populations and behaviour of South African bats, both in areas with and without wind turbines, is needed to better inform future assessments of the cumulative effects of WEFs on bats.

Nature of impact: Cumulative mortality of bats due to collision with turbine blades or barotrauma caused by turbine operation across multiple wind energy facilities.

The cumulative impacts will depend on the number of wind energy facilities in the region, the species involved, the levels of bat mortality and mitigation measures implemented at each wind energy facility. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.

There are approximately 5 planned and 1 operational wind energy facilities within a 50 km radius of the Spreeukloof WEF. The assessment below assumes all facilities implement appropriate mitigation measures.

	Authorised		**Proposed amendment**	
	Without mitigation	**With mitigation**	**Overall impact of the proposed project considered in isolation1**	**Cumulative impact of the project and other projects in the area**
Extent	Regional (3)	Study Area (2)	High (4)	High (4)
Duration	Permanent (4)	Long Term (3)	Long Term (4)	Long term (4)
Magnitude	High (3)	Medium (2)	Minor (2)	Moderate (6)
Probability	Highly Probable (3)	Improbable (1)	Improbable (2)	Probable (3)
Significance	**Medium (30)**	**Low (7)**	**Low (20)**	**Medium (42)**
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	-	-	Low	Low
Irreplaceable loss of resources?	-	-	Yes	Yes
Can impacts be mitigated?	-	-	Yes	-

Mitigation:

» All currently proposed mitigation measures proposed in the Spreeukloof WEF EMPr / EA must be adhered to. This

[1] Table values assume that all mitigations have been followed.

includes adhering to the updated sensitivity map (**Figure 5.2**) which will require repositioning 2 turbines that intrude into high sensitivity buffers. These buffers are regarded as high sensitivity areas for turbine components only, and other infrastructure (roads, cables etc) are permissible. These areas include 200m around all cliff lines potential roosts and all other important bat features. Should important features, including wind pumps and water reservoirs be removed or covered, these buffers would not apply and can be removed.

- » Should it not be possible to move these turbines, then more stringent mitigation measures set out in the original pre-construction bat impact assessment report, which would include curtailment, would need to be implemented as soon as turbines are erected. This would include a turbine cut-in speed of 8 m/s at hub-height for these turbines in February and March from sunset to sunrise and in January, April, September, October, November and December from sunset for 2.5 hours, and only when temperatures are 9 °C or higher. The sunset and sunrise times to be adjusted each month according to the seasonal changes in these times.
- » In the event that turbines can be micro-sited, then a bat specialist must map the final turbine layout before micro-siting and assess whether all turbines are appropriately sited in such a way that their blades do not encroach into any bat sensitive buffers.
- » Additionally, a full operational phase monitoring campaign, inclusive of fatality monitoring and estimates, is to commence as soon as the wind turbines are erected, and in accordance with latest version of the bat monitoring guidelines. This is to take place for the entire Spreeukloof WEF. Based on results from this monitoring campaign, should the estimated bat fatalities for the entire Spreeukloof WEF exceed the threshold of 69 bats per annum, then strict curtailment measures will need to be implemented – to be defined and monitored by an appropriate bat specialist.
- » All mitigation measures to protect bats proposed in the Spreeukloof WEF EMPr must be adhered to.

Additional mitigation measures

- » The impacts presented can be mitigated by using turbines which maximise the ground clearance as much as possible, and by minimising the tip height (i.e. the distance between the ground and the blade tip at its highest point). The lowest tip should not encroach any lower than 30 m above ground, in order to reduce the risk of bat mortalities from reaching the specified estimated threshold limits of 31 bats per annum.

Residual Impacts:

Residual impacts may still remain even if the high sensitivity buffers are adhered to and by using turbines of an appropriate size to limit bat fatalities. Bat fatalities are a widely occurring phenomenon having been reported across Europe, North America, Central America, Brazil, India, Australia and South Africa (Baerwald and Barclay 2011; Barros et al. 2015; Hein and Schirmacher 2016; Hull and Cawthen 2012; Kumar et al. 2013; Rodríguez-Durán and Feliciano-Robles 2015; Rydell et al. 2010). Furthermore, evidence has shown that pre-construction monitoring data may not be able to adequately predict post-construction fatality risk (Hein et al. 2013), and that bats actively investigate and forge around turbines (Cryan et al. 2014; Foo et al. 2017). This suggests that there may still be fatality impacts. Residual impacts can likely be reduced if curtailment is used when appropriate as this has been shown to be one of the most effective mitigation measures (Arnett and May 2016).

5.2.2. Conclusion

Compared to the currently authorised turbine layout and dimensions of Spreeukloof WEF, it is likely that the change in turbine dimensions would (without mitigation) slightly increases mortality impacts on bats. This is primarily because of a potentially higher ground to lower tip height as well as the location of some turbines in bat sensitive areas – placing bats (particularly lower flying species using open spaces for commuting and foraging) at a higher risk. However, due to the overall lower rotor swept area these impacts will only slightly increase the risk of bat mortality. As such, the significance of bat mortality will remain medium-high before mitigation and low after mitigation for mortality during foraging, and medium before mitigation and low after mitigation for mortality during migration. Cumulative impacts are likely to be of a medium significance before mitigation and low after mitigation. The specialist further found that all other amendments are either administrative in nature or do not significantly change impacts to bats and, as such, do not change the assessment or outcomes of this report.

The key initial mitigation measure that should be implemented at the Spreeukloof WEF would be adherence to the latest high sensitivity and medium-high sensitivity buffer distances in this report and in the Spreeukloof WEF pre-construction bat impact report. There are currently 2 turbines that need to be relocated (Refer **Figure 5.2**). Should it not be possible to move these turbines, then more stringent mitigation measures set out in the original pre-construction bat impact assessment report, which would include curtailment, would need to be implemented as soon as turbines are erected. This would include a turbine cut-in speed of 8 m/s at hub-height for these turbines in February and March from sunset to sunrise and in January, April, September, October, November and December from sunset for 2.5 hours, and only when temperatures are 9 °C or higher. The sunset and sunrise times to be adjusted each month according to the seasonal changes in these times.

It is also recommended to maximise the ground clearance and minimise the tip height (i.e. the distance between the ground and the blade tip at its highest point) as much as possible. More specifically, it is not recommended for the lowest blade tips to encroach any lower than 30 m above ground, as turbines with a lower ground clearance run the risk of reaching the fatality thresholds sooner.

A full operational phase monitoring campaign, inclusive of fatality monitoring and estimates, is to commence as soon as the wind turbines are erected, and in accordance with latest version of the operational bat monitoring guidelines. Based on results from this operational monitoring campaign, should the estimated bat fatalities for the entire Spreeukloof WEF exceed the threshold of 31 bats per annum, then strict curtailment measures will need to be implemented – to be defined and monitored by an appropriate bat specialist. Blade feathering must also be implemented at the start of operation to prevent blade free-wheeling. This is to take place for the entire Spreeukloof WEF.

Based on the proposed amendments and the updated assessment, it is the opinion of the specialist that the amendment can be authorised, on condition that all recommendations are strictly adhered to.

5.3. Ecological and Freshwater Impact

The ecological and freshwater specialist assessment (refer **Appendix C**) conducted an assessment of the site, which included a walkdown conducted in June 2021 of the proposed layout from a terrestrial ecology and aquatic perspective. The specialist was requested to study the particulars of the proposed amendment and provide an assessment on whether the proposed changes would result in any additional, increased or decreased terrestrial ecology and aquatic impacts to those that were assessed in the original EIA.

The specialist study confirmed the following from both a terrestrial ecology and aquatic specialist perspective:

- That the proposed infrastructure will only impact on areas where road crossings will be required, all other infrastructure, i.e. turbines, substations and grid connections will either avoid or span these areas.
- Will not change or increase the nature or severity of any of the impacts originally identified and reported on during the EIA or the subsequent amendment applications (direct and cumulative impacts).
- Will have no additional impacts to those identified previously in the study (direct and cumulative impacts).

» Will not require any additional management outcomes or mitigation measures for the terrestrial or aquatic environment.

5.3.1. Comparative Assessment

The specialist study found that the refined layout related to the Spreeukloof WEF, as is the subject of the current amendment application, (i.e. reduce turbine numbers and relocation of the grid infrastructure), has no material change on the assessment, findings, impacts (direct and cumulative) (including nature, significance category and mitigation measures) and recommendations of the specialist report included within the original EIA. From a terrestrial ecology and aquatic standpoint, the results are identical, and the proposed amendments have no material effect on the original specialist assessment conducted for the project and does not impact on an area of higher sensitivity than that originally authorised. The recommendations and findings of the original assessment report (Hoare, 2010) therefore apply without modification to the refined layout. It is further confirmed that the environment has not changed significantly from that during the original assessment.

5.3.2. Conclusion

The amendments that are being proposed, have been proposed in order to avoid environmental sensitivities identified as confirmed in the June 2021 site survey and walkthrough. As the proposed amendments do not incur any change in impact (direct or cumulative) from that determined in the original assessment for the project, no additional mitigation measures are required. It is however recommended that a final assessment of the proposed layout with entire construction footprint, is evaluated to ensure all areas are micro-sited outside of the identified aquatic ecosystem.

This report thereby serves to confirm that from a terrestrial ecology and aquatic perspective, the refined layout as is the subject of the current amendment application, amendments to the turbine specifications, layout, revised grid connection and substation locations, capacity increase and EA holder change, has no material change on the assessment, findings, impacts (including nature, significance and mitigation measures) and recommendations of the original specialist report. Therefore, the results of the assessment are identical and the change in location that forms part of the proposed amendments have no material effect on the specialist assessment conducted for the project.

Furthermore, these changes do not impact on an area of higher sensitivity than that originally authorised, thus the recommendations and findings of the report apply without modification to the refined layout.

To conclude, the initial ecological assessment, that included terrestrial ecology and aquatic assessment findings can be upheld, and when coupled to the proposed amended layout, no direct impacts to any critical terrestrial or aquatic ecosystems with a Very High sensitivity are anticipated. The environment has not changed significantly from that during the original assessment. The proposed amendments are therefore supported in terms of terrestrial ecology and aquatic biodiversity considerations, on the condition that all of the proposed infrastructure:

» Will remain outside of the delineated freshwater feature footprints, with the exception of roads which are considered acceptable.
» All works within the regulated area of a watercourse are suitably authorised under the National Water Act (No. 36 of 1998), as relevant and applicable, prior to the commencement of construction.

5.4. Impacts on heritage resources

As part of the original process followed for the Dorper Wind Energy Project and the authorised layout for Spreeukloof WEF, Binneman, Booth and Higgitt (2010) conducted an archaeological impact assessment. According to Binneman et al. (2010), "Surface scatters of Middle Stone Age (MSA) stone artefacts were observed over most of the area surveyed. These occur between the surface and approximately 50 cm below the current surface level. Later Stone Age (LSA) stone artefacts were also observed as surface scatters, but mainly occurred in density around the koppies and rocky outcrops. Stone walling and remains thereof occur on the landscape, mainly as dam walls, but also as remaining foundations of buildings. Stone walling was also observed in some rock shelters on the koppies/rocky outcrops, which may either have been used as stock kraals/pens and to provide shelter from the wind as occupation areas. Historical buildings and abandoned farmhouses with outside rubbish dumping areas containing stoneware and porcelain ceramics as well as glass, iron and copper also occur within the proposed area for development. Graveyards and informal burials were also observed within the proposed area, most of the burials are deemed to be older than 60 years. No other associated archaeological materials were observed with the stone artefact scatters, and it is unlikely that the stone artefacts would be in primary context. No sites containing any depth of deposit or other archaeological material associated with the stone tool artefacts and archaeological material were observed within the proposed area for development." Refer to **Figure 5.3** for heritage resources map previously identified within the study area, with SAHRIS Site IDs. The amendment layout showing heritage resources with recommended buffer zones is further shown in **Figure 5.4.**

The area proposed for the amended turbine layout is underlain by sediments of very high palaeontological sensitivity according to the SAHRIS Palaeo sensitivity Map (**Figure 5.5**). The sediments underlying the development consist of Jurassic Dolerite (zero palaeontological sensitivity) and the Molteno Formation of the Karoo Supergroup (very high palaeontological sensitivity). As part of the original EA process, a desktop palaeontological assessment was conducted by Dr John Almond (2010, SAHRIS NID 92684) and a Phase 1 Palaeontology field assessment was completed by Fourie (2012, SAHRIS NID 92690). According to Fourie (2012), "Sporadic overlying Elliot Formation is mapped in the southern and north-eastern portions of the study area and minor underlying Burgersdorp Formation is mapped in the western and southern edges of the study area. The Molteno Formation is known to have the richest Triassic (c. 220-million-year-old) fossil floras recorded anywhere in the world, as well as some of the oldest known dinosaur trackways. Several key fossil sites are already recorded within the Molteno Formation in the Molteno-Sterkstroom outcrop area." According to Fourie (2012), "Fossils such as plants, insects and dinosaur trackways were not observed due to the thick layer of topsoil and subsoil. Small Molteno outcrops were observed but will not influence the placement of the wind turbines but may be considered in the placement of the internal access roads and underground cabling." Fourie (2012) recommends that any significant fossils identified during construction are recorded, removed and that associated geological data is collected. This can take place through the implementation of a Chance Fossil Finds Procedure.

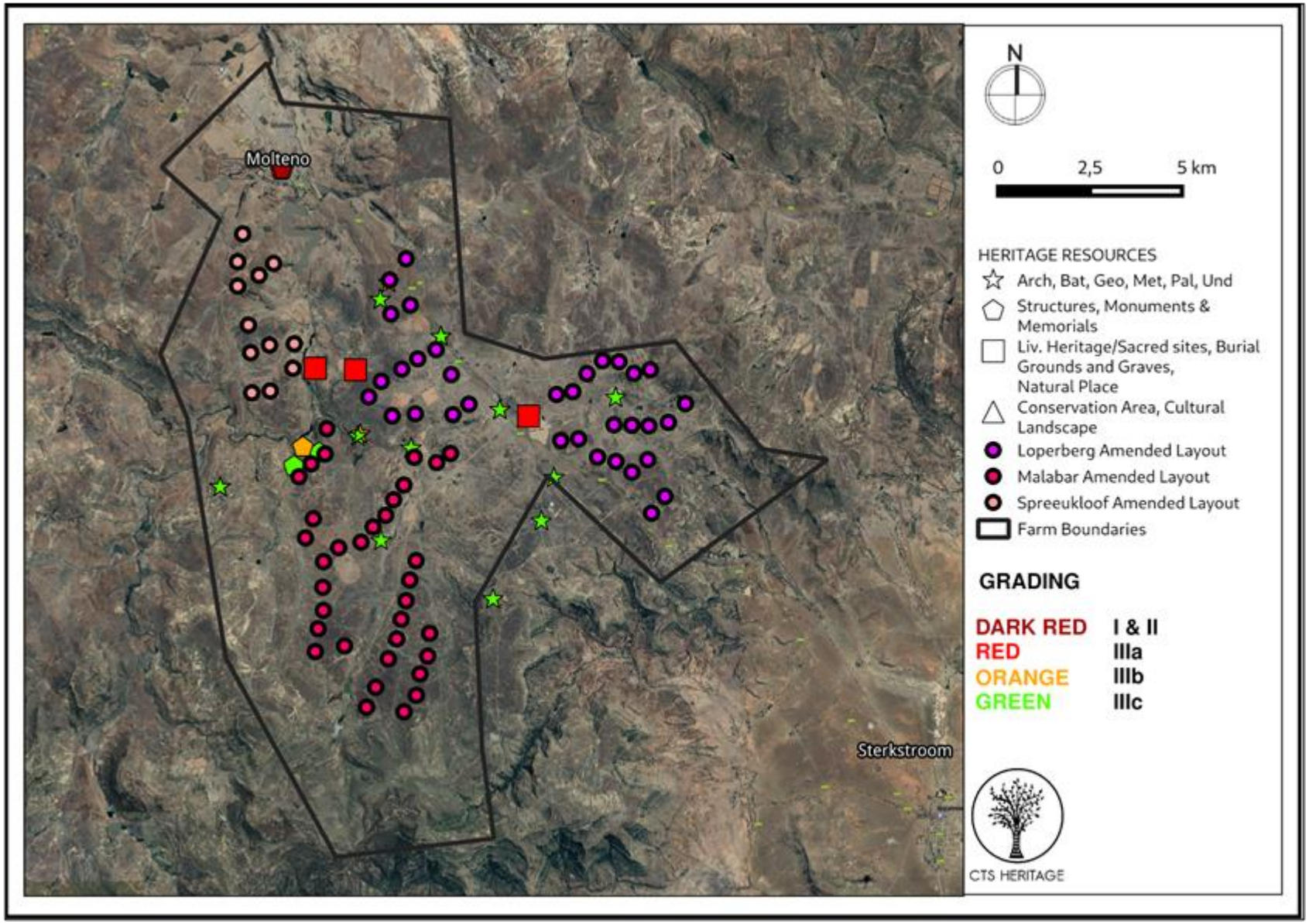

Figure 5.3: Heritage Resources Map previously identified within the study area, with SAHRIS Site IDs

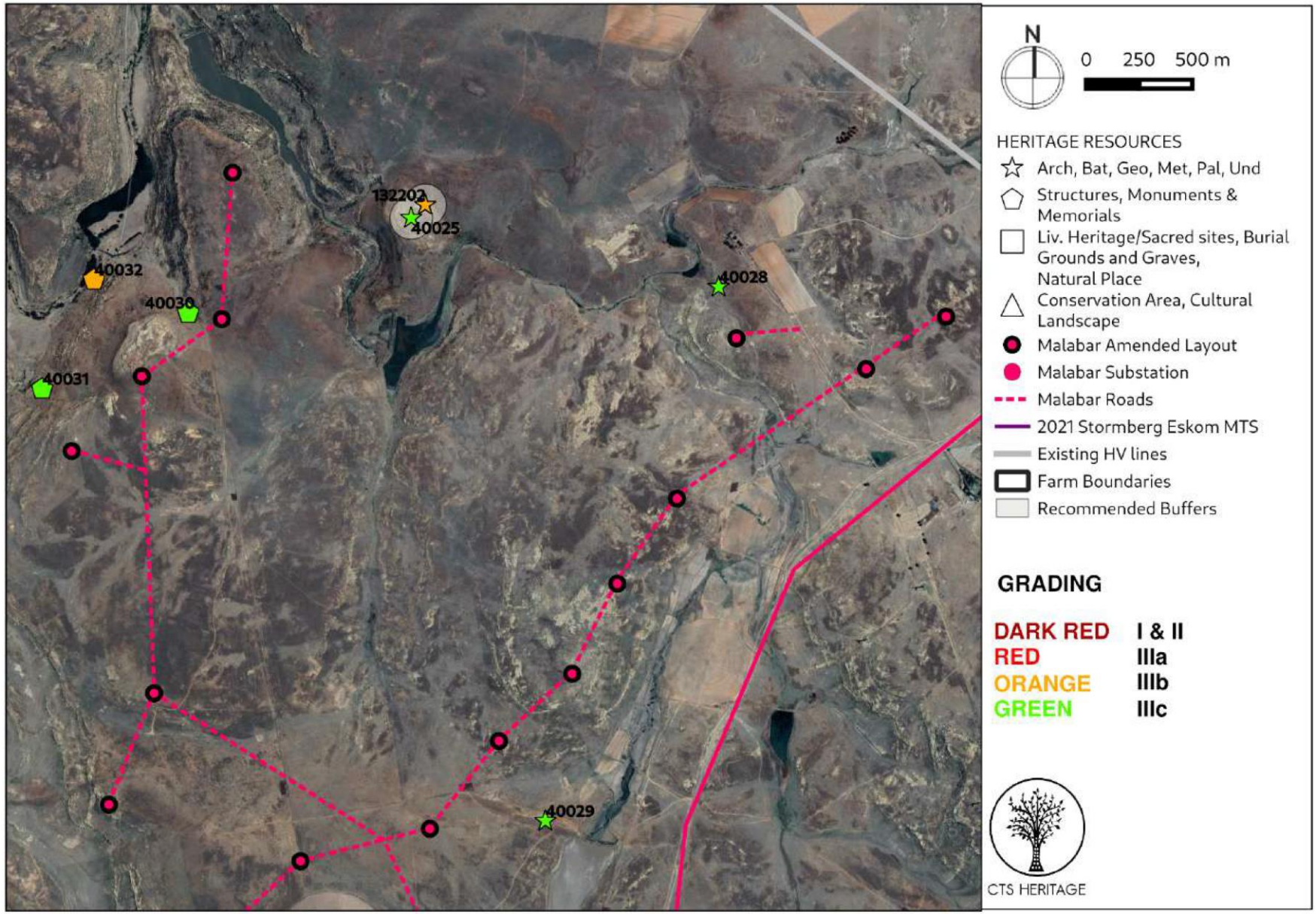

Figure 5.4: Heritage resources map of the amendment scenario layout (2021), including recommended specialist buffer areas.

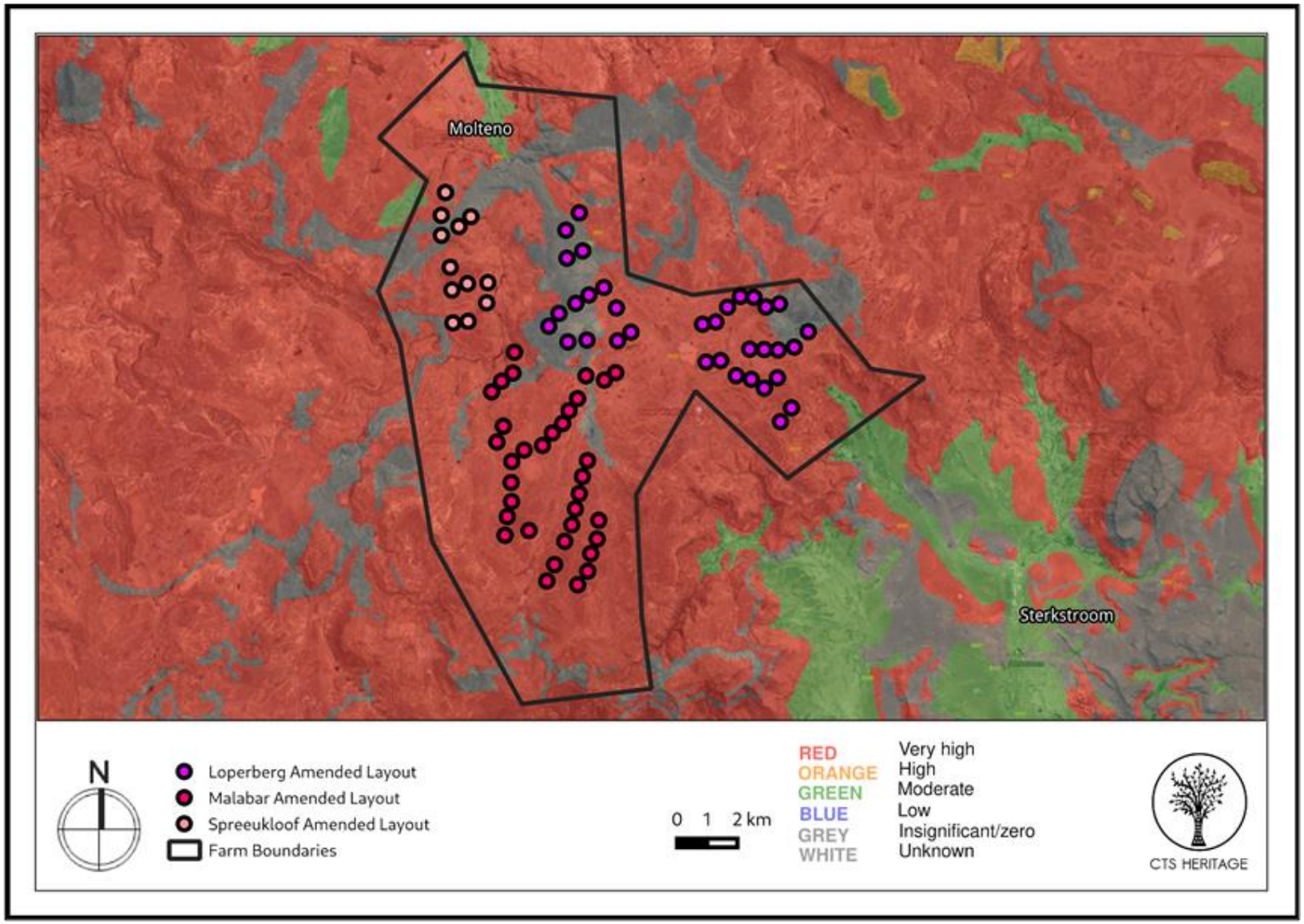

Figure 5.5: Palaeosensitivity Map indicating varied fossil sensitivity underlying the study area. Turbine locations for Spreeukloof WEF are indicated in Red.

5.4.1. Comparative Assessment

In response to the original Archaeological Assessment Binneman et al. (2010) made several recommendations:

- If any of the existing buildings are planned to be demolished during the course of development, a built-environment heritage specialist or historian must be appointed to assess the significance of the built environment and historical buildings.
- The grave and burial areas must be identified and cordoned off prior to the commencement of development so that no negative impact and vandalism occurs.
- Once the exact coordinates for the wind turbines are established an archaeologist should be appointed to inspect the exact and immediate surrounding area for possible sites.
- Further recommendations may follow after the investigation.
- A professional archaeologist should be appointed during the construction phases to observe whether any depth of deposit and in situ archaeological material remains is uncovered.
- It is unknown whether any in situ archaeological sites/remains, and human remains would be uncovered during construction. However, if concentrations of archaeological heritage material and human remains are uncovered during construction, all work must cease immediately and be reported to the Albany Museum (046 622 2312) and/or the South African Heritage Resources Agency (SAHRA) (021 642 4502) so that systematic and professional investigation/excavation can be undertaken (See Appendix A for a list of possible archaeological sites that maybe found in the area).
- Construction managers/foremen should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

Importantly, the recommendations provided by Binnerman are supported by the comments on the original application from SAHRA as summarised below:

- Recording of the Stone Age scatters including the collection of an indicative sample must be undertaken for the identified sites. SAHRA will require that, in terms of s. 38 (4)(b&c) of the National Heritage Resources Act, the provisions of s. 35 apply, as appropriate. The specialist will require a collection permit from the Eastern Cape Provincial Heritage Resources Authority (ECPHRA).
- Monitoring by an archaeologist must be undertaken for the sites where a higher concentration of stone tools was recorded. A monitoring report must be then submitted to the ECPHRA for further comments.
- Monitoring by an archaeologist must be undertaken during vegetation clearing of sections which could not be surveyed because of the thick vegetation cover. A monitoring report must be then submitted to the ECPHRA for further comments.
- An ECO must be trained by a palaeontologist on the identification of fossil material and on procedures to follow if fossil material is identified during construction;
- Graves and burial grounds must be avoided by the proposed turbine sites. Any graves/burial grounds located close to the proposed sites must be properly fenced off, prior to development. The fence must be erected at least 5m from the graves and a buffer zone of 20-30m must be respected between the fence and the development.
- Where the identified graveyards are still in use, access must be allowed for communities to continue doing so, otherwise plans must be made to address their needs.
- A Phase 2 Impact Assessment needs to be undertaken for the historical graveyard (site 33). Recording and mapping of the graves including photographs should form part of the Phase 2 report, which should

also give an indication of the state of the graves. A Heritage Management Plan should be included in this report.

» If any structure older than 60 years requires alteration or demolition a Conservation Architect must be contacted and a report sent to the Heritage Authority for comment. No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant heritage resources authority (s. 34 (1)).

» No development should occur within 50m from any stone walling sites. Stone walling sites should be fenced off if any development activities are meant to occur between 50 and 100m from the stone walling. If a buffer zone of 50m cannot be kept, a Phase 2 Impact Assessment must be undertaken. Where development occurs between 50 and 100m of a stone walling site, monitoring by an archaeologist is requested during construction and a report from monitoring activities must be submitted to the ECPHRA.

Based on the information available now and the proposed amendments, the current assessment of the significance of impacts on heritage sites and palaeontology compared to the original assessment are as follows. **Please note:** the mitigation measures supplied here are not novel additions and are reproductions of the impacts stated in the 2012 final EIAR and final SAHRA comment on the project.

Impacts on heritage sites

Nature of impact: Potential loss of stone artefact scatters and possible sites during construction				
	Authorised		**Proposed amendment**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	International (5)	International (5)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	High (5)	Low (1)	Low (1)	Low (1)
Probability	Highly probable (5)	Improbable (1)	Improbable (1)	Improbable (1)
Significance	**50 (Medium)**	**30 (Medium)**	**7 (Low)**	**7 (Low)**
Status (positive or negative)	Negative	Negative	Neutral	Neutral
Reversibility	low	low	Low	Low
Irreplaceable loss of resources?	Yes		Possible	Possible
Can impacts be mitigated?	Yes		Yes	Yes
Mitigation: • Recording of the Stone Age scatters including the collection of an indicative sample must be undertaken for the identified sites. SAHRA will require that, in terms of s. 38 (4)(b&c) of the National Heritage Resources Act, the provisions of s. 35 apply, as appropriate. The specialist will require a collection permit from the Eastern Cape Provincial Heritage Resources Authority (ECPHRA). • Monitoring by an archaeologist must be undertaken for the sites where a higher concentration of stone tools was recorded. A monitoring report must be then submitted to the ECPHRA for further comments. • Monitoring by an archaeologist must be undertaken during vegetation clearing of sections which could not be surveyed because of the thick vegetation cover. A monitoring report must be then submitted to the ECPHRA for further comments. • An ECO must be trained by a palaeontologist on the identification of fossil material and on procedures to follow if fossil material is identified during construction; • Graves and burial grounds must be avoided by the proposed turbine sites. Any graves/burial grounds located close to the proposed sites must be properly fenced off, prior to development. The fence must be erected at least 5m from the graves and a buffer zone of 20-30m must be respected between the fence and the development. • Where the identified graveyards are still in use, access must be allowed for communities to continue doing so, otherwise plans must be made to address their needs. • A Phase 2 Impact Assessment needs to be undertaken for the historical graveyard (site 33). Recording and mapping				

of the graves including photographs should form part of the Phase 2 report, which should also give an indication of the state of the graves. A Heritage Management Plan should be included in this report.

- If any structure older than 60 years requires alteration or demolition a Conservation Architect must be contacted and a report sent to the Heritage Authority for comment. No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant heritage resources authority (s. 34 (1)).
- No development should occur within 50m from any stone walling sites. Stone walling sites should be fenced off if any development activities are meant to occur between 50 and 100m from the stone walling. If a buffer zone of 50m cannot be kept, a Phase 2 Impact Assessment must be undertaken. Where development occurs between 50 and 100m of a stone walling site, monitoring by an archaeologist is requested during construction and a report from monitoring activities must be submitted to the ECPHRA.

This impact has reduced in significance as compared to the original assessment as described above.

Impacts: Palaeontology

Nature of impact: Nature: Disturbance or destruction of valuable fossil heritage within the potentially highly fossiliferous Molteno Formation Several key fossil sites are already recorded within the Molteno Formation to the northeast of Indwe. Excavations for new access roads and wind turbine emplacements may well disturb, damage, or destroy scientifically valuable fossils during the construction phase of this development.

	Authorised		**Proposed amendment**	
	Without mitigation	**With mitigation**	**Without mitigation**	**With mitigation**
Extent	International (5)	International (5)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5) – High	Permanent (5) – High
Magnitude	Very High (10)	Very High (10)	Very High (10)	Very High (10)
Probability	Highly probable (4)	Improbable (1)	Probable (3)	Low (1)
Significance	**80 (High)**	**20 (Low)**	**48 (Medium)**	**16 (Low)**
Status (positive or negative)	Negative	Negative	Negative	Neutral
Reversibility	None	None	Low Any impacts to heritage resources that do occur are irreversible	Low Any impacts to heritage resources that do occur are irreversible
Irreplaceable loss of resources?	Yes	Yes	Possible	Possible
Can impacts be mitigated?	Yes but to a limited extent		Yes	Yes

Mitigation:

- Recording of the Stone Age scatters including the collection of an indicative sample must be undertaken for the identified sites. SAHRA will require that, in terms of s. 38 (4)(b&c) of the National Heritage Resources Act, the provisions of s. 35 apply, as appropriate. The specialist will require a collection permit from the Eastern Cape Provincial Heritage Resources Authority (ECPHRA).
- Monitoring by an archaeologist must be undertaken for the sites where a higher concentration of stone tools was recorded. A monitoring report must be then submitted to the ECPHRA for further comments.
- Monitoring by an archaeologist must be undertaken during vegetation clearing of sections which could not be surveyed because of the thick vegetation cover. A monitoring report must be then submitted to the ECPHRA for further comments.
- An ECO must be trained by a palaeontologist on the identification of fossil material and on procedures to follow if fossil material is identified during construction;
- Graves and burial grounds must be avoided by the proposed turbine sites. Any graves/burial grounds located close to the proposed sites must be properly fenced off, prior to development. The fence must be erected at least 5m from the graves and a buffer zone of 20-30m must be respected between the fence and the development.
- Where the identified graveyards are still in use, access must be allowed for communities to continue doing so,

otherwise plans must be made to address their needs.
- A Phase 2 Impact Assessment needs to be undertaken for the historical graveyard (site 33). Recording and mapping of the graves including photographs should form part of the Phase 2 report, which should also give an indication of the state of the graves. A Heritage Management Plan should be included in this report.
- If any structure older than 60 years requires alteration or demolition a Conservation Architect must be contacted and a report sent to the Heritage Authority for comment. No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant heritage resources authority (s. 34 (1)).
- No development should occur within 50m from any stone walling sites. Stone walling sites should be fenced off if any development activities are meant to occur between 50 and 100m from the stone walling. If a buffer zone of 50m cannot be kept, a Phase 2 Impact Assessment must be undertaken. Where development occurs between 50 and 100m of a stone walling site, monitoring by an archaeologist is requested during construction and a report from monitoring activities must be submitted to the ECPHRA.

This impact has reduced slightly in significance as compared to the original assessment as described above.

5.4.2. Conclusion

The comparative specialist assessment concluded that there are no advantages or disadvantages associated with the proposed amendments. Based on the information available, and due to the reduced number of turbines in the amended layout, the impact has reduced in significance as compared to the original assessment. The proposed amendments therefore slightly reduce the significance of impacts identified in the original EIA process on condition that the recommendations from SAHRA are implemented. From a heritage perspective the proposed amendment is therefore supported on condition that the recommendations from SAHRA articulated above are implemented. In addition, no novel mitigation measures are required or recommended from a heritage perspective.

5.5. Visual impact

This visual assessment addendum letter **(Appendix E)** includes a comparative viewshed analysis in order to determine the visual exposure (visibility) of the original (authorised) turbine dimensions compared to the potential (additional) exposure of the increased (proposed) turbine dimensions and amended layout. The viewshed analysis focuses on a radius of 5km from the proposed turbine layout (development footprint) and potential visual receptors located within this zone. The original VIA report determined that receptors, where visible, within this zone may experience a **high** visual impact of the proposed infrastructure

Potential sensitive visual receptors include observers residing at homesteads (farm residences and dwellings) within the study area, and observers travelling along the arterial, main or secondary roads traversing near or over the proposed development site.

5.5.1. Comparative Assessment

A viewshed analysis was undertaken (**Figure 5.4**) from each of the authorised wind turbine positions (21 in total) at an offset of 182.5m (maximum tip height) above ground level. The result of this analysis represents the potential total visual exposure of the original and authorised turbine dimensions (indicated in green and purple on **Figure 5.4**). The viewshed analysis was repeated at an offset of 208m to indicate the visual exposure (shown in red) of the increased turbine dimensions and reduced number of turbines (9 in total)

proposed as part of the amendment. The results of the viewshed analyses are displayed on **Figure 5.5** overleaf.

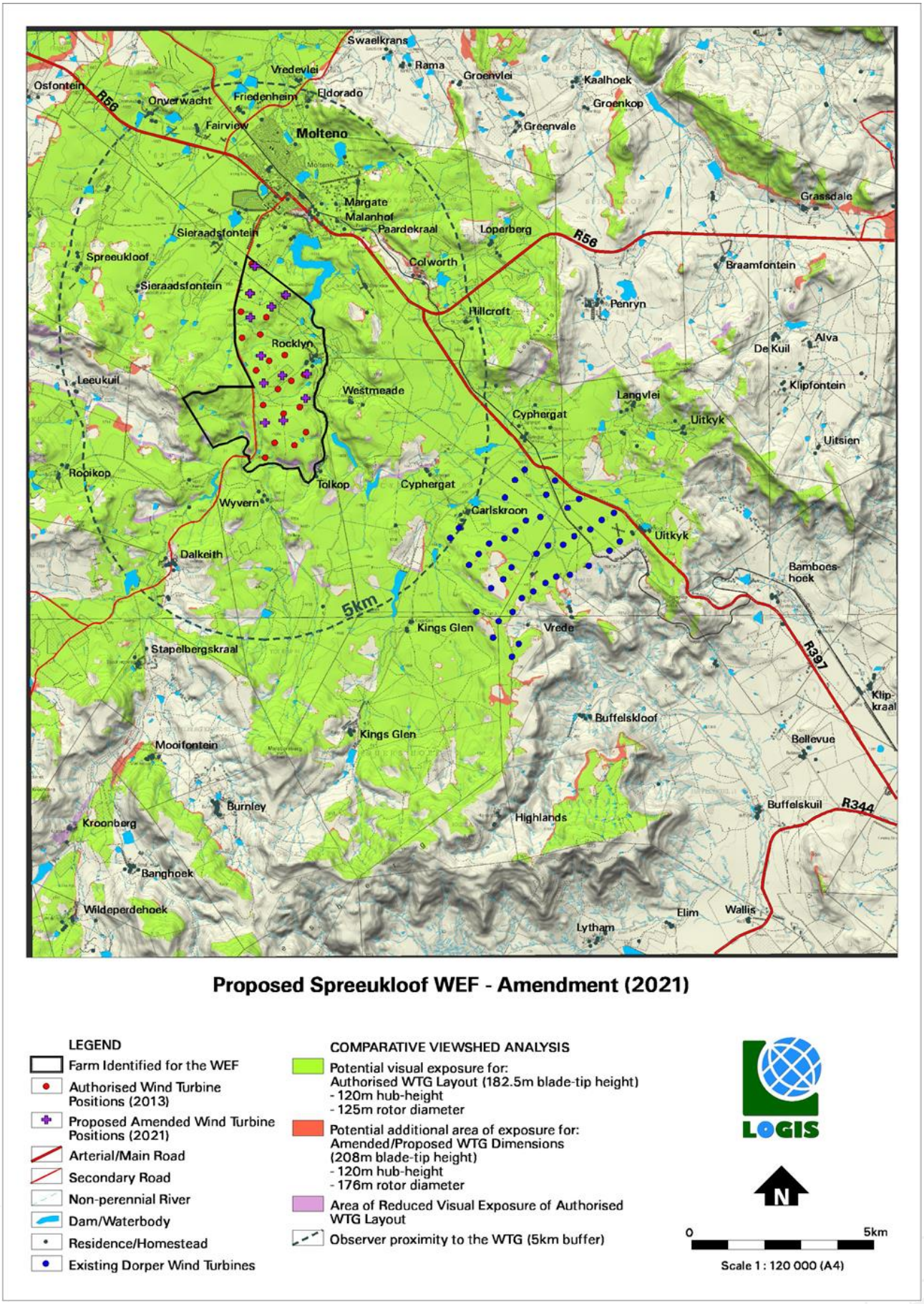

Figure 5.5: Comparative Viewshed Analysis for Spreeukloof Wind Farm

The analysis indicated that with the proposed amendments, approximately 12% increase in turbine dimensions, would have a relatively small influence on the overall visual exposure, due to the already tall turbine structures previously approved and the elevated positions of the turbines within the landscape. The surface area (within the study area) of the original turbine exposure is 274km^2, compared to the 277km^2 of the increased dimensions of the wind turbine exposure. This is an increase of 3km^2, or alternatively, an increase of less than 1% in potential visual exposure. It should be noted that the above calculation includes an area of 4km^2 that represents the surface area that won't be visually exposed after the reduction in the number of wind turbines.

There are no additional sensitive visual receptors located within the area of increased visual exposure.Potential sensitive visual receptors within an approximately 5km radius (identified during the EIA phase) include:

- Sieraadsfontein
- Spreeukloof
- Leeukuil
- Onverwacht
- Fairview
- Friedenheim
- Vredevlei
- Eldorado
- Molteno
- Margate
- Malanhof
- Paardekraal
- Colworth
- Hillcroft
- Wyvern
- Rooikop
- Rocklyn[1]
- Westmeade[2]
- Cyphergat[2]
- Cyphergat[3]
- Tolkop[3]
- Kings Glen[3]
- Carlskroon[4]
- Observers travelling along the R397 main, R56 arterial and secondary roads traversing near or over the proposed development site

The increased area of visual exposure does not include a significant portion of additional exposure to the arterial, main or secondary roads within the study area.

Note:

- The homestead marked 1 is located on the farm earmarked for the Spreeukloof WEF development, assuming its approval of the WEF development.

- » The homesteads marked 2 are located on the farm earmarked for the Loperberg WEF development, assuming their approval of the WEF development.
- » The homesteads marked 3 are located on the farm earmarked for the Malabar WEF development, assuming their approval of the WEF development.
- » The homestead marked 4 is located within the existing Dorper WEF, assuming its approval of the WEF development.
- » Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time as it is inhabited again
- » The increased area of visual exposure does not include a significant portion of additional exposure to the arterial, main or secondary roads within the study area.

It is expected that the wind turbine structures, both the original dimensions and the proposed increased dimensions would be equally visible and noticeable from both the roads and homesteads identified above, therefore signifying a negligible change to the potential visual impact.

The revised 132kV grid connection line location and substation position both fall within the wind turbine development footprint and is not expected to influence the potential visual impact significantly.

In consideration of the proposed amendments, there is no (zero) change to the significance rating compared with the original EIA visual impact assessment report. Furthermore, no additional mitigation measures are considered necessary for the purposes of the amended scenario and the mitigation measures provided in the original EIA therefore remain suitable and applicable.

It is worth noting that the Spreeukloof WEF is located within the Stormberg Wind Renewable Energy Development Zone No. 4 (REDZ4) as determined by the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015 – CSIR/DEA). The consolidation and concentration of the wind energy facilities within this zone is therefore preferred and the cumulative visual impact is deemed to be of an acceptable level.

5.5.2. Conclusion

The proposed increase in the dimensions of the wind turbine structures is not expected to significantly alter the influence of the WEF on areas of higher viewer incidence (observers traveling along the arterial, main or secondary roads within the region) or potential sensitive visual receptors (residents of homesteads in close proximity to the WEF).

The proposed increase in dimensions are consequently not expected to significantly influence the anticipated visual impact, as stated in the original VIA report (i.e. the visual impact is expected to occur regardless of the amendment). This statement relates specifically to the assessment of the visual impact within a 5km radius of the wind turbine structures (potentially high significance), but also generally apply to potentially moderate to low visual impacts at distances of up to 20km from the structures.

In spite of the fact that no individual receptors would benefit from the reduction in the number of wind turbines from 21 to 12, it is still considered to be a positive from a visual impact perspective. It will reduce the overall frequency of visual exposure of wind turbine structures within the region.

From a visual perspective, the proposed changes will therefore require no (zero) changes to the significance rating within the original visual impact assessment report that was used to inform the approved EIA. In addition to this, no new mitigation measures are required. The specialist further found that all other amendments were of administrative nature and had no impact on the assessment outcomes or results.

It is suggested that the proposed amendment to the turbine dimensions and layout be supported, subject to the conditions and recommendations as stipulated in the original Environmental Authorisation, and according to the Environmental Management Programme and suggested mitigation measures, as provided in the original Visual Impact Assessment report.

5.6. Noise impact

A noise impact assessment was undertaken considering the revised layout and turbine specifications. During the site visit, ambient sound levels were measured over at least two full night-time period at a number of locations using class-1 Sound Level Meters (SLMs) with the measurement localities presented in **Figure 5.6** as blue squares and **Figure 5.7** indicating site sensitivity and closest identified noise-sensitive developments. The SLMs would measure "average" sound levels over 10-minute periods, save the data and start with a new 10-minute measurement till the instrument was stopped. The SLMs were referenced at 1,000 Hz directly before and after the measurements were taken. In all cases drift was less than 1.0 dBA.

The potential noise impact of the amended scenario for the proposed Spreeukloof WF was evaluated using a sound propagation model. Noise levels were calculated in detail for the amended scenario with impact tables calculated without comparing the impact with the previous noise study. Conceptual scenarios were developed for the revised layout subject to the current amendment application for the construction and operation phases, resulting in the following:

- A potential noise impact of a low significance during the day for the construction phase of the proposed WEF and no additional mitigation is required. This is the same as the findings in the 2012 noise study;
- A potential noise impact of a medium significance before mitigation for night-time construction activities, with proposed mitigation available to allow the reduction of the potential noise impact to a low significance. While discussed, the 2012 noise study did not assess the noise impact of potential night-time construction activities;
- A potential noise impact of a low significance for the construction of the proposed access roads during the daytime period. While briefly discussed, the 2012 noise study did not assess the noise impact of potential access road construction activities;
- A potential noise impact of a low significance for potential daytime construction traffic noises. While briefly discussed, the 2012 noise study did not assess the noise impact of potential daytime construction traffic noises;
- A potential noise impact of a low significance for operation of the proposed wind turbines at night. The daytime noise impact would be less than the potential night-time noise impact. The 2012 noise study did find a significance of medium for the operational phase; and
- A potential noise impact of a low significance for the decommissioning of the proposed WEF. The 2012 noise study did not assess the noise impact relating to decommissioning activities.

It was concluded that the development of the Spreeukloof WF will not increase cumulative noises in the area.

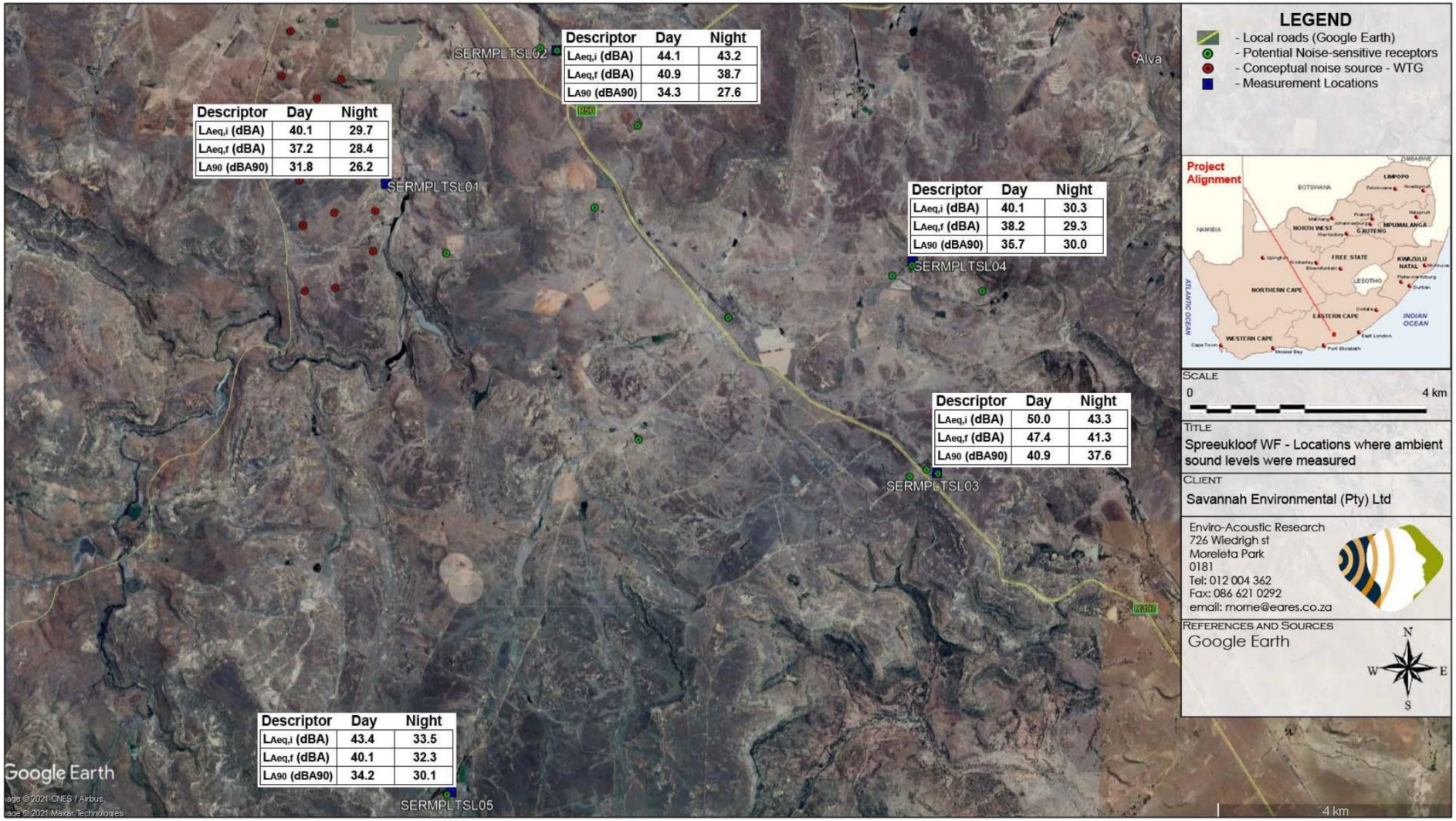

Figure 5.6: Localities where ambient sound and noise levels were measured

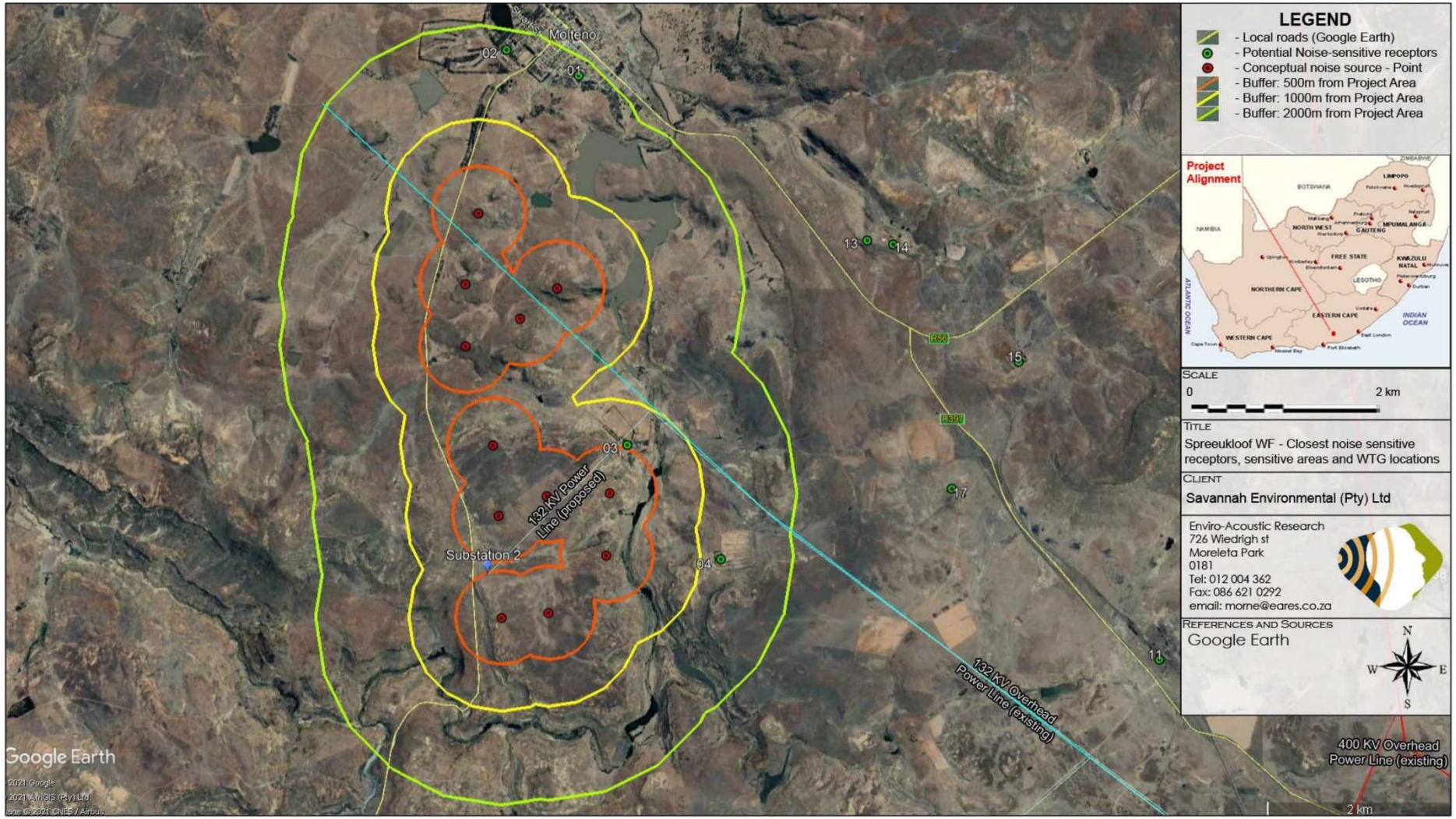

Figure 5.7: Aerial Image indicating site sensitivity and closest identified Noise-sensitive developments

5.6.1. Comparative Assessment

The average daytime ambient sound levels were measured at 42.2 dBA, with average night-time ambient sound levels being 33.3 dBA (low wind speeds). During periods with increased wind speeds, the average daytime ambient sound levels were 51.7 dBA, with average night-time ambient sound levels being 47.5 dBA. The significance of the potential daytime noise impacts is summarized in **below** for potential daytime construction activities (for the highest noise level).

Impact Assessment: Construction Activities during the day

Aspect / Impact pathway: The potential impact is assessed per NSD. Various construction activities taking place simultaneously during the day will increase ambient sound levels due to air-borne noise. Noise levels due to construction activities close to NSD03 may be as high as 45.3 dBA, depending on the number of simultaneous activities taking place close to the identified NSDs.		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels (Construction)**	
All NSDs	Noise levels as high as 45.3 dBA	Mitigation not required, though considered
Without mitigation	**Mitigation not required**	
Status (positive/negative)	Negative	Negative
Magnitude	Medium (6 – NSD 05)	Minor to Low (2 - 4)
Duration	Temporary (1)	Temporary (1)
Extent	Local (2)	Local (2)
Probability	Improbable (1)	Improbable (1)
Significance	**Low Risk (9)**	**Low Risk (5 - 7)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes, but not required.	-
Confidence in findings: High. Worst-case scenario evaluated with all equipment operating under full load close to identified receptors. Low daytime ambient sound levels assumed.		
Mitigation: Significance of noise impact is low for the scenario as conceptualized and no mitigation measures are required or recommended.		
Cumulative impacts: Potential of cumulative noise impact is low.		

While night-time construction activities are not envisaged, but there may be times when activities may take place after 22:00 at night, or before 06:00 in the mornings. Considering potential delays' relating to civil works (especially concrete pouring that must be undertaken in one go).

Impact Assessment: Construction Activities at night

Aspect / Impact pathway: Various construction activities taking place simultaneously at night will increase ambient sound levels due to air-borne noise. Noise levels due to construction activities close to the NSD may be as high as 45.3 dBA (NSD03), depending on the number of simultaneous activities taking place close to the identified receptors. Increased noise may be audible during low-wind conditions and may be disturbing during the very quiet night-time periods, especially if the construction activities take place between the hours of 01:00 and 04:00 – quietest periods at night (simultaneous activities closer than 1 000 m from these receptors).		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels (Construction)**	
All NSDs	Noise levels as high as 45.3 dBA	Noise levels less than 45 dBA

Without mitigation		**With mitigation**
Status (positive/negative)	Negative	Negative
Magnitude	Very High (10)	Medium (6)
Duration	Temporary (1)	Temporary (1)
Extent	Regional (3)	Local (2)
Probability	Highly Likely (4)	Improbable (1)
Significance	**Medium Risk (56)**	**Low Risk (9)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes.	-
Confidence in findings: High. Worst-case scenario evaluated with all equipment operating under full load. Very low night-time ambient sound levels assumed.		
Mitigation: There is a potential for a noise impact if night-time construction activities take place near NSD03. Night-time construction activities at this distance is not recommended and it should be minimized where possible. The receptor at NSD03 should be notified before night-time construction activities are permitted within 600 m.		
Cumulative impacts: Potential of cumulative noise impact is low.		

Considering the proposed layout of the Spreeukloof WF, it is unlikely that access roads will pass closer than 250 m from potential receptors. However, the noise levels associated with the construction of the access roads were estimated, with construction noise levels being well within the acceptable zone sound level (45 dBA for a rural noise district during the day) if the roads are further than approximately 250 m from the closest receptors.

For an average of 10 vehicles travelling at an average 40 km/h on a gravel road, noise from construction traffic will be well within the acceptable zone sound level (45 dBA) if the roads are further than approximately 60 m from the closest receptors (daytime construction activities). The potential impact of daytime traffic is assessed below.

Due to very low ambient sound levels at night, night-time traffic could result in a noise level of up to 35 dBA at 600 m and around 42 dBA at 120 m (a potential disturbing noise) from the roads used for construction. This should be considered if any night-time activities are envisaged requiring significant traffic to pass within 120 m from residential dwellings at night.

Impact Assessment: Construction of roads (daytime)

Aspect / Impact pathway: Construction of roads during the day may increase ambient sound levels temporarily. Construction activities closer than 100 m from the identified NSDs could result in noise levels exceeding 55 dBA, higher than the IFC recommended noise limits for residential use. Construction activities closer than 250 m from the identified NSDs could result in noise levels exceeding 45 dBA, higher than the zone sound levels for a rural area.		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels (Construction)**	
All NSDs	Construction activities closer than 100 m	Construction activities closer than 100 m
Without mitigation	**Without mitigation**	
Status (positive/negative)	Negative	Negative
Magnitude	Very high (10)	Very high (10)
Duration	Temporary (1)	Temporary (1)

Extent	Local (2)	Local (2)
Probability	Probable (2)	Probable (2)
Significance	**Low Risk (26)**	**Low Risk (26)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes, but not required.	-
Confidence in findings: High. Worst-case scenario evaluated with construction of access road close to the NSDs.		
Mitigation: Significance of noise impact is very low for the scenario as conceptualized.		
Cumulative impacts: Potential of cumulative noise impact is low.		

Impact Assessment: Daytime construction traffic

Aspect / Impact pathway: Various construction vehicles passing close to potential noise-sensitive receptors may increase ambient sound levels and create disturbing noises.		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels (Construction)**	
All NSDs	Construction traffic passing closer than further than 200 m	No mitigation is required
Without mitigation	**Without mitigation**	
Status (positive/negative)	Negative	Negative
Magnitude (Table 8-3)	Medium to Very high (6 - 10)	Medium to Very high (6 - 10)
Duration (Table 8-4)	Short (2)	Short (2)
Extent (Table 8-5)	Local (2)	Local (2)
Probability (Table 8-6)	Probable (2)	Probable (2)
Significance (Table 8-7)	**Low Risk (20 - 28)**	**Low Risk (20 - 28)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes, but not required.	-
Confidence in findings: High. Worst-case scenario evaluated with construction traffic passing within 100 m from an NSD.		
Mitigation: Significance of noise impact is very low for the scenario as conceptualized. It is however recommended that roads not be constructed within 150 m from occupied dwellings used for residential purposes (to reduce noise levels below 42 dBA if construction traffic may use the road at night).		
Cumulative impacts: Potential of cumulative noise impact is low.		

Operation phase noise impact

Only the night-time scenario was assessed, as this is the most critical time period when a quiet environment is desired. There is a potential noise impact of low significance, as the maximum noise levels was calculated to be less than 45 dBA at all identified receptors. The projected noise rating levels would be less than 45 dBA at all NSDs at a 8 m/s wind. The projected noise rating levels would be less than 45 dBA (the recommended acceptable night-time noise limit) at all NSDs at an 8 m/s wind.

Impact Assessment: Operational Activities at night

Aspect / Impact pathway: WTG operating simultaneously at night. Ambient sound level measurements indicate that sound levels would be elevated during periods that the WTG will be operational. It is definite that the noise levels will be less than 45 dBA (using a sound power emission level of 107.2 dBA re 1 pW).		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels**	
All NSDs	Noise levels less than 45 dBA	Noise levels less than 45 dBA
Without mitigation	**Without mitigation**	
Status (positive/negative)	Negative	Negative
Magnitude	Minor (2)	Minor (2)
Duration	Long (4)	Long (4)
Extent	Regional (3)	Regional (3)
Probability	Likely (3)	Likely (3)
Significance	**Low Risk (27)**	**Low Risk (27)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes, but not required.	-
Confidence in findings: High. Worst-case scenario evaluated.		
Mitigation: Noise levels is well below 45 dBA and additional mitigation is not required.		
Cumulative impacts: Potential of cumulative noise impact is low.		

Cumulative noise impact

The contribution from the Spreeukloof WF on total cumulative noises (together with the existing Dorper WEF as well as if the Spreeukloof and Spreeukloof WEFs are also developed) will be less than 3 dBA. Total noise levels at NSDs 14 and 17 will exceed 45 dBA, though this is due to the noise impact from other WEFs in the area. Mitigation as proposed for the operational phase will reduce the noise levels to less than 45 dBA. The potential significance of the noise impact due to cumulative impacts is low however.

Impact Assessment: Potential Cumulative Impacts Operational

Aspect / Impact pathway: Wind turbines from various WEFs operating simultaneously at night. Increases in ambient sound levels due to air-borne noise from the wind turbines.		
Nature of potential impact: Increase in ambient sound levels.		
Receiver no	**Projected Noise Levels**	
All NSDs	Noise levels less than 45 dBA	Noise levels less than 45 dBA
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Status (positive/negative)	Negative	Negative
Magnitude	Low (4)	Low (4)
Duration	Long (4)	Long (4)
Extent	Regional (3)	Regional (3)
Probability	Probable (2)	Probable (2)
Significance	**Low Risk (22)**	**Low Risk (22)**
Reversibility	High	High
Loss of resources	Medium	Medium
Can impacts be mitigated?	Yes, but not required.	-
Confidence in findings:		

High. Worst-case scenario evaluated.
Mitigation: Significance of noise impact is low for the scenario as conceptualized.
Cumulative impacts: Potential of cumulative noise impact is low.

Final decommissioning activities will have a noise impact lower than either the construction or operation phases. This is because decommissioning and closure activities normally take place during the day using minimal equipment (due to the decreased urgency of the project). While there may be various activities, there is a very small risk for a noise impact. The significance of any noise impact would be low, similar to the construction noise impact.

5.6.2. Conclusion

The potential noise impact of the proposed Spreeukloof WF was evaluated using a sound propagation model. The development of the Spreeukloof WF will not increase cumulative noises in the area. Considering the low significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed WEF and associated infrastructure, it is recommended that the Part II Amendment for the proposed Spreeukloof WF be authorized. The specialist further found that all other amendments were of administrative nature and had no impact on the assessment outcomes or results. Specific additional, novel mitigation measures have been provided based on the remodelled noise findings as per the amendment layout provided and are to be included into the project EMPr. These mitigation measures are detailed above and have been incorporated into the EMPr update for the project (refer **Appendix G**).

6. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(a)(ii), this section provides details of the advantages and disadvantages of the proposed amendment.

Advantages of the amendment	Disadvantages of the amendment
General	
The increase in rotor diameter will increase the efficiency of the facility and consequently the economic viability thereof. Increased efficiency of a facility is beneficial to the environment as this will reduce the need for additional facilities to generate additional electricity. It is also beneficial from a macroeconomic perspective as it results in the lower cost per unit of energy, ultimately benefiting the South African public.	None
The number of wind turbines is proposed to be reduced from the 21 wind turbines originally approved, to the proposed 12 wind turbines. This would result in a reduced footprint and lower impacts on the environment	None
As a result of the delays in the REIPPP Programme the project has been unable to bid and therefore may only do so now and for any future bidding rounds. As the EA must be valid during bidding, the validity of the EA needs to be extended to allow for bidding under this (round 5) and future rounds of the REIPPPP (or similar programmes under the IRP).	None
Avifauna	
Overall reduction in construction footprint – reducing extent of degradation of habitat and possibly reducing disturbance caused by construction	None
Reduction in footprint of the updated layout, built wind farm – reducing the amount of habitat finally lost to the destructive footprint of the facility	None
The proposed amendment to the facility layout makes a slight positive difference to risk to birds, although not sufficient to alter the original impact assessment findings.	None
Bats	
A reduction in the number of turbines means a smaller footprint is required and therefore less vegetation clearance and habitat loss.	It is possible that some bat species, particularly those not adapted to use open-air spaces, are being killed at the lower sweep of the turbine blades so increasing the blade length and having a shorter distance between the ground and the lowest rotor point may have a negative impact and potentially place a greater diversity of species at risk.
Most turbines are located away from highly sensitive areas.	Increasing the individual Rotor Swept Area of each turbine could increase the chances that bats will collide with turbine blades at a turbine location scale.

Advantages of the amendment	Disadvantages of the amendment
The number of bat species that might be impacted would decrease because not all bat species use the airspace congruent with the rotor swept area of modern turbines owing to morphological adaptations related to flight and echolocation.	None
Ecology & Freshwater	
Reduction in footprint and lower impacts on the environment (in terms of flora and fauna)	None
Heritage	
None	None
Visual	
Fewer wind turbines in the landscape.	Marginally increased extent of potential visual exposure. There are however no sensitive visual receptors located within the area of increased visual exposure that will be affected by the amended turbine dimensions and layout
Noise	
The development of the Spreeukloof WEF will not increase cumulative noises in the area.	None

Based on the above, it can be concluded that the advantages of the proposed change outweigh the disadvantages from an environmental and technical perspective.

7. REQUIREMENTS FOR ADDITIONAL MITIGATION AS A RESULT OF THE PROPOSED AMENDMENTS

As required in terms of Regulation 32(1)(a)(iii), consideration was given to the requirement for additional measures to ensure avoidance, management and mitigation of impacts associated with the proposed change. From the specialist inputs provided into this amendment motivation, it is concluded that the mitigation measures proposed within the EIA would be sufficient to manage potential impacts within acceptable levels. Updated mitigation measures are however provided by the Avifauna, Bat and Noise specialists as provided in Sections **5.1.2, 5.2.1** and **5.6.1** respectively. These additional mitigation measures are recommended based on additional information available regarding interactions of sensitive species with wind farms and in the case of noise on the significant changes in environmental regulations and legislation since the date of the original noise studies, in particular SANS 10328:2008 requiring a comprehensive Environmental Noise Impact Assessment (ENIA), and not because of the proposed amendments alone. These updated mitigation measures have been included within the EMPr (**Appendix G**) to be submitted as part of the amendment application, to ensure they are made binding on the developer and contractors.

8. PUBLIC PARTICIPATION

A public participation process is being conducted in support of a Part 2 application for amendment of the Environmental Authorisation for the Spreeukloof Wind Energy Facility in the Eastern Cape Province.

A full Interested and Affected Party (I&AP) database is included in **Appendix H1**[2]. It must be noted that the project is to be developed on the same farm portions as originally authorised, all of which, are privately owned. The affected landowners were informed of the part 2 amendment process, and they gave consent as required by the DFFE. The amendment to the Environmental Authorisation will not result in impacts on any additional interested and affected parties.

The public participation for the proposed amendment process included:

- The Draft Motivation Report has been made available for a public review period on www.savannahsa.com from **Friday, 23 July 2021** until **Friday, 03 September 2021.**
- Written notification to registered I&APs (refer to **Appendix H2**) and Organs of State (refer to **Appendix H3**) regarding the proposed amendments and the availability of the Draft Motivation Report was sent on **Friday, 23 July 2021**. The notification regarding the availability of the extension of the review period from Monday, **23 August 2021 to Friday, 03 September 2021** was sent on 06 August 2021.
- Advertisements has been placed in the **Die Rep newspaper** on **Friday, 23 July 2021 and Friday, 06 August 2021** (refer to **Appendix H4**).
- Site notices will be placed at the site on **Friday, 06 August 2021**.

Comments received during the public review period have been included in this final submission to the DFFE for consideration in the decision-making process. Comments have been included and responded to in the Comments and Responses Report (C&RR) included in Appendix H of the final Motivation Report submission.

[2] Contact details of I&APS are not included due to POPIA requirements.

9. CONCLUSION

Based on the specialist findings, it is concluded that the proposed amendments to the turbine specifications, the reduced number of turbines (and associated change to the wind farm layout), as well the revised overhead powerline and substation location, are the subject of this application, will have slight increases to the significance ratings for the identified potential impacts. Specific findings were issued by the respective specialists, summarised below:

- **Avifaunal** specialist found that the proposed amendment to the facility layout makes a slight positive difference to risk to birds, although not sufficient to alter the original impact assessment findings. In addition, The proposed amendment to the turbine model increases the per-turbine collision risk window but this is offset to some extent by the reduced number of turbines. The collision risk window of the wind farm as a whole is increased (by 13.2%). Finally, new information which has become available subsequent to the original assessment has made a significant difference to the rating of the impact of mortality of birds through collision with turbines. This impact has increased in significance from Medium-High to High under the current assessment. Two key species which were previously 'suspected' to potentially be susceptible to turbine collision (Verreaux's Eagle & Cape Vulture) have subsequently proven to actually be susceptible to turbine collision at operational wind farms and have also been upgraded in conservation status (Verreaux's Eagle from Least Concern to Vulnerable regionally; Cape Vulture from Vulnerable to Endangered regionally and globally), indicating that they require more protection than thought previously. This risk will need to be mitigated proactively from the start of operations (and earlier in some cases as described in this report). The cumulative impact of wind energy on birds in this area is now of High significance pre-implementation if mitigation, which can then be mitigated to Medium if the recommendations of this report are adhered to. The proposed amendment to power line routing is acceptable and makes little difference to the risk to avifauna. The remaining amendments are administrative of nature and make no difference for avifauna. These amendments are therefore all acceptable..
- **Bat** specialist found that, compared to the currently authorised turbine layout and dimensions of Spreeukloof WEF, it is likely that the change in turbine dimensions would (without mitigation) slightly increases mortality impacts on bats. This is primarily because of a potentially higher ground to lower tip height as well as the location of some turbines in bat sensitive areas – placing bats (particularly lower flying species using open spaces for commuting and foraging) at a higher risk. However, due to the overall lower rotor swept area these impacts will only slightly increase the risk of bat mortality. As such, the significance of bat mortality will remain medium-high before mitigation and low after mitigation for mortality during foraging, and medium before mitigation and low after mitigation for mortality during migration. The specialist further found that all other amendments are either administrative in nature or do not significantly change impacts to bats and, as such, do not change the assessment or outcomes of this report. Cumulative impacts are likely to be of a medium significance before mitigation and low after mitigation.
- **Freshwater and ecological** specialist confirmed that the refined layout as is the subject of the current amendment application, amendments to the turbine specifications, layout, revised grid connection and substation locations, capacity increase and EA holder change, has no material change on the assessment, findings, impacts (including nature, significance and mitigation measures) and recommendations of the original specialist report. Therefore, the results of the assessment are identical and the change in location that forms part of the proposed amendments have no material effect on the specialist assessment conducted for the project. Furthermore, these changes do not impact on an

area of higher sensitivity than that originally authorised, thus the recommendations and findings of the report apply without modification to the refined layout.

» The **heritage** specialist concluded that there are no advantages or disadvantages associated with the proposed amendments. Based on the information available, and due to the reduced number of turbines in the amended layout, the impact has reduced in significance as compared to the original assessment. The proposed amendments therefore slightly reduce the significance of impacts identified in the original EIA process on condition that the recommendations from SAHRA are implemented. From a heritage perspective the proposed amendment is therefore supported on condition that the recommendations from SAHRA articulated above are implemented. In addition, no novel mitigation measures are required or recommended from a heritage perspective.

» The **visual** assessment indicated that the reduced number of wind turbines (12 turbines), together with the proposed changes in turbine specifications would result in similar overall visual impact significance ratings to that determined in the original VIA and subsequent amendments. The proposed amendments would result in no change in the overall visual impact significance ratings (including cumulative impact ratings) and no new visual mitigation measures are deemed necessary. Provided that the conditions and recommendations listed in the original visual impact study are adhered to, the existing Environmental Authorisation for the Spreeukloof Wind Energy project should still be valid. The specialist's opinion from a visual perspective is that the proposed amendments should be approved. The specialist further found that all other amendments were of administrative nature and had no impact on the assessment outcomes or results.

» The **noise** specialist determined that the development of the Spreeukloof WF will not increase cumulative noises in the area. Considering the low significance of the potential noise impacts (with mitigation, inclusive of cumulative impacts) for the proposed WEF and associated infrastructure, it is recommended that the Part II Amendment for the proposed Spreeukloof WF be authorized. Specific additional, novel mitigation measures have been provided based on the remodelled noise findings as per the amendment layout provided and are to be included into the project EMPr. These mitigation measures are detailed above and have been incorporated into the EMPr update for the project (refer **Appendix G**). The specialist further found that all other amendments were of administrative nature and had no impact on the assessment outcomes or results.

All specialists concluded that the amendments proposed are considered acceptable from their respective specialisation, provided the mitigation measures supplied are implemented and adhered to by the developer. These mitigation measures have been included within the EMPr (**Appendix G**) to be submitted as part of the amendment application, to ensure they are made binding on the developer and contractors.

9.1. Optimization of the layout

The development footprint was designed by the project developer in order to respond to and avoid the sensitive environmental features located within the development site. This approach ensured the application of the mitigation hierarchy (i.e. avoid, minimise, mitigate and offset) to the Spreeukloof Wind Farm project, which ultimately ensures that the development is appropriate from an environmental perspective and is suitable for development within the project site. The application of the mitigation hierarchy was undertaken by the developer prior to the commencement of the Part 2 amendment process, as detailed in Chapter 5, and further considered based on specialist study findings. Two (2) proposed turbines fall within bat high sensitivity areas, and it has been recommended by the specialist that these turbine positions be adjusted during the design phase in order to avoid these sensitive areas. Should it not be possible to move these turbines, then more stringent mitigation measures which would include curtailment would

need to be implemented as soon as turbines are erected. With the implementation of the optimised layout which avoids impacts on high bat sensitivity areas (or where unavoidable implements the required mitigation strategy), the development footprint is considered to be suitable and appropriate from an environmental perspective for the wind farm, as it ensures the avoidance, reduction and/or mitigation of all identified detrimental or adverse impacts on sensitive features as far as possible. The proposed layout is presented in **Figure 9.1**, which meets the recommendations of the specialists. This has been included in the updated EMPr (**Appendix G**).

9.2. Overall Conclusion and Recommendations

The specialist studies undertaken as part of the amendment application process have concluded that there are no fatal flaws associated with the proposed amendments being requested by the developer for the Malabar Wind Energy Facility. Based on the specialist findings, it is concluded that the proposed amendments to the turbine specifications, wind farm layout and EA validity are not expected to result in an increase to the significance ratings for the identified potential impacts. In some cases (avifauna and bats), the quantitative value has changed in terms of the magnitude of impacts, but this has not resulted in a change to the qualitative category (i.e. Low, Medium. High) of the significance rating after mitigation measures. It must be noted that changes in significance ratings in the case of avifauna and bats is due to new information available from operational wind farms and not due to the proposed amendments. There is a reduction in significance in some impacts as a result of the reduced number of turbines and the location of these outside of identified high sensitivity areas.

In addition, the amended wind turbine positions considered avoids all identified avifaunal exclusion zones and areas of high sensitivity (refer to Figure 9.1).

It is further confirmed that the environment has not changed significantly from that during the original assessment. The amendment in itself does not constitute a listed activity. The mitigation measures described in the original EIA document are adequate to manage the expected impacts for the project. Additional mitigation measures have been recommended by the avifauna, bat and noise specialists and, as a result of this proposed amendment, the updated mitigation measures and recommendations has been included within the project EMPr (**Appendix G**) to be submitted as part of this amendment application.

Given the above, Spreeukloof Wind Farm (Pty) Ltd requests the following amendments as part of this application:

i. Amendment of turbine specifications, to be as follows: Wind turbine generators (up to 12 turbines), comprising a hub height of 'up to 120m' and rotor diameter of 'up to 176m' from the currently authorised number of 21 turbines with hub height and rotor diameter of 120m and 125m, respectively.
ii. A reduction in the authorised number of turbines from the currently authorised 21 turbines, to reflect as 'up to 12' wind turbines. An updated layout has been provided for the amendment towards reflecting the removal of turbines from that currently authorised. (refer **Figure 2.1**).
iii. Update of the project description to reflect the revised co-ordinates of the 132kV grid connection line routing and substation location as per the revised layout.
iv. Amendment to the holder of the Environmental Authorisation
v. Amendment to the capacity of the Spreeukloof Wind Farm
vi. Extension of the Environmental Authorisation (EA) validity by an additional two years

These requested amendments will result in an optimisation of the layout assessed within the EIA and allow the project to bid within future bidding programmes under the IRP. As required in terms of Condition 28 of the EA, the final layout will be submitted to the DFFE for review and approval once a turbine supplier has been selected for the project during the final design process.

It is worth noting that the facility, including all associated infrastructure, is wholly located within the Stormberg Renewable Energy Development Zone (REDZ 4) as determined by the Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa (2015 – CSIR/DEA), and formally gazetted on 16 February 2018 (GN 114) and 26 February 2021(GN 142, 144 and 145). As such, the development is in accordance with the strategic goals of the REDZ, and subject to the reduced, authority review timeframe of 57 days.

Taking into consideration the conclusions of the studies undertaken for the proposed amendments (as detailed in **Appendix A–F**), it is the opinion of the EAP that these amendments are considered acceptable from an environmental perspective, provided that the original and additional mitigation measures stipulated herein are implemented.