

Ecological Assessment Report

**Prieska Power Reserve (Pty) Ltd
Wind Power Generation Facility
Development, Northern Cape**

Province

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Compiled for:



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Executive Summary

The project applicant, Prieska Power Reserve (Pty) Ltd, proposes to formally develop vacant portions of land on top of a significantly sized mountain range, for a 224.4 MW wind turbine power generation facility outside the town of Prieska, Northern Cape Province. The mountain range consists of three separate but connected mountaintop plateaus. The proposed development on these mountaintop plateaus will constitute the construction of the following infrastructure:

- Thirty-four (34) separate wind turbines and associated laydown areas
- Wind turbine access/service road network
- 33 kV electrical transmission line- and its associated access/service road network
- Two (2) electrical combiners

The following infrastructure will also be constructed throughout the flat bottomland areas, surrounding the mountain range as well as the transitional zone between the flat bottomland areas and the mountain range:

- Main site access/service road which will connect the proposed development to the existing provincial road network
- A single 132 kV electrical transmission line and its associated access/service road, which will mostly run parallel to an existing ESKOM line, but will not tie into the ESKOM electrical grid at any point
- A temporary equipment and construction materials laydown area will also be cleared within the flat bottomland area at the foot of the mountain range, from where access to the three mountaintop plateaus will be obtained
- A security gate and subsequent security corridor

Green Box Consulting was appointed by CENEC (Pty) Ltd (applicant representatives) as the independent Environmental Assessment Practitioner (EAP), to conduct the legally required Ecological Impact Assessment (EIA) process.

Due to the nature of potential ecological impacts posed by the proposed development to the local ecosystem and ecology, an Ecological study is required. This is required in order to determine the potential presence of ecologically/conservationally significant or sensitive species, habitats, wetlands or ecosystems, which may be adversely affected by the proposed development. Any potential ecological impacts associated with the proposed development, must be identified. Impact mitigation and management measures in accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) Mitigation Hierarchy, must subsequently be recommended. This must be done in order to attempt to reduce/alleviate the adverse effects of identified potential ecological impacts.

EcoFocus Consulting was therefore consequently appointed by the EAP as the independent ecological specialist, to conduct the required Ecological study for the proposed development. This report constitutes the Ecological Assessment.

Site assessments for the proposed development areas throughout the flat bottomland areas and transitional zone surrounding the mountain range, were conducted on 30 & 31 August 2021. These dates form part of the commencement of the new growing season. At the time of the site assessments, the area had however not received adequate initial rainfall yet. It must therefore be noted that the timing of the assessments was not necessarily favourable for successful identification of all plant species individuals.

Site assessments for the proposed development areas throughout the mountaintop plateaus, were conducted on 04, 05 & 06 April 2022. These dates form part of the growing season and most plant species present, could therefore be successfully identified. It must however be noted that the timing of the assessments was not necessarily favourable for successful identification of underground bulb plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted, prior to the commencement of the proposed development, during the flowering period of underground bulb plant species. This will ensure that no provincially protected or other conservationally significant plant species have potentially been omitted.

Methodology

The proposed development area was assessed on foot and with the use of a vehicle. Visual observations/identifications were made of habitat conditions, any ecologically sensitive/conservationally significant areas as well as relevant species present. Identified species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 as well as the Provincially Protected species of the Northern Cape Nature Conservation Act (Act 9 of 2009). Georeferenced photographs were taken of ecologically sensitive/conservationally significant areas as well as any Red Data Species Listed, nationally- or provincially protected species if encountered, in order to indicate their specific locations in a Geographic Information System (GIS) mapping format.

Potential ecological impacts of the proposed development on the surrounding environment were identified, evaluated, rated and discussed. The Present Ecological State (PES) as well as the Ecological Importance and Sensitivity (EIS) of the proposed development area were also determined and discussed.

Assessment Area

The assessment areas are situated approximately 10 km south-east of the town of Prieska. The town forms part of the Siyathemba Local Municipality which in turn, forms part of the Pixley Ka Seme District Municipality, Northern Cape Province. Access to the assessment areas is obtained by way of the R 357 provincial road and subsequent dirt roads, from the west.

The proposed development on the three separate but connected mountaintop plateaus will constitute the construction of the following infrastructure:

- Thirty-four (34) separate wind turbines and associated laydown areas of approximately 80 m x 125 m (0.96 ha) in size each
 - This equates to a combined total footprint area of approximately 32.64 ha in size
- Wind turbine access/service road network
 - Significant portions of the proposed access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road network. It will also be maintained as such, over time.

- 33 kV electrical transmission line- and its associated access/service road network
 - The transmission line network servitudes will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. They will also be maintained as such, over time.
 - Significant portions of the proposed access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear farm tracks of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission lines, for the entire proposed access/service road network. They will also be maintained as such, over time.
- Two (2) electrical combiners of approximately 0.5 ha in size each
 - This equates to a combined total footprint area of approximately 1 ha in size
- The three mountaintop plateau assessment areas are situated on the following properties:
 - Portions 2 & 11 of the Farm Prieskas Poort No. 51 (SG 21 Digit Codes: C06000000000005100002 & C06000000000005100011)
 - Portions 3, 4, 8 & 9 of the Farm Karabee No. 50 (SG 21 Digit Codes: C06000000000005000003, C06000000000005000004, C06000000000005000008 & C06000000000005000009)
 - Portion 12 of the Farm T` Keikams Poort No. 71 (SG 21 Digit Code: C06000000000007100012)

The following infrastructure will also be constructed throughout the flat bottomland areas, surrounding the mountain range as well as the transitional zone between the flat bottomland areas and the mountain range:

- Main site access/service road which will connect the proposed development to the existing provincial road network
 - Virtually the entirety of the proposed access/service road constitutes existing farm tracks, while certain new road portions will also be constructed. A narrow linear physical footprint section of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road. It will also be maintained as such, over time.

- A single 132 kV electrical transmission line and its associated access/service road, which will mostly run parallel to an existing ESKOM line, but will not tie into the ESKOM electrical grid at any point
 - The transmission line servitude will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. It will also be maintained as such, over time.
 - Significant portions of the proposed access/service road constitute existing farm tracks, while certain new road portions will also be constructed. A narrow linear farm track of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission line, for the entire proposed access/service road. It will also be maintained as such, over time.
- A temporary equipment and construction materials laydown area of approximately ≤ 1 ha in size, will also be cleared within the flat bottomland area at the foot of the mountain range, from where access to the three mountaintop plateaus will be obtained
- A security gate and subsequent security corridor of approximately 0.6 ha in combined total size
- The flat bottomland and transitional zone assessment areas are situated on the following properties:
 - Remaining Extent of Erf 1 of the town of Prieska (RE/1)
 - Portions 1 & 11 of the Farm Prieskas Poort No. 51 (SG 21 Digit Codes: C0600000000005100001 & C0600000000005100011)

Results and Conclusion

According to SANBI (2006-2019), the three mountaintop plateau assessment areas form part of the Lower Gariep Broken Veld vegetation type (NKb 1). The flat bottomland assessment areas surrounding the mountain range, however fall within the Bushmanland Arid Grassland vegetation type (NKb 3). Both of these vegetation types are classified as Least Concerned (SANBI, 2006-2019).

The entirety of the three mountaintop plateau- and the flat bottomland assessment areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province.

Water Catchment and Drainage

The proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, will merely traverse five (5) small ephemeral water drainage lines/preferential flow paths as well as a single significant first-order ephemeral watercourse, throughout the three mountaintop plateaus. These drainage lines/flow paths and single significant watercourse assist with channelling and discharging surface water runoff from small portions of the mountaintop plateaus, towards the surrounding flat bottomland areas. From a hydrological perspective, these drainage lines/flow paths and single significant watercourse therefore merely play a minor assisting role in the local catchment and drainage, associated with surface water runoff from the mountain range.

These drainage lines/flow paths and single significant watercourse are therefore not viewed as being of high conservational significance/value, from a hydrological or ecological perspective. It is however not anticipated that the proposed development at these flow path/drainage line- and single significant watercourse crossings, should significantly impede or impact on their flow regimes.

The proposed main site access/service road and the 132 kV electrical transmission line with its associated access/service road, will traverse numerous significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths at approximately sixty-one (61) locations, throughout the flat bottomland areas and transitional zone. These watercourses and drainage lines/flow paths are responsible for a significant portion of the local catchment and drainage, associated with surface water runoff throughout the flat bottomland areas surrounding the mountain range. The significant watercourses therefore form an important part of the local and broader quaternary surface water catchment- and drainage area. It is however not anticipated that the proposed development at these significant watercourse- and flow path/drainage line crossings, should significantly impede or impact on their flow regimes.

Due to the lack of continuous water flow throughout the mountaintop plateaus and flat bottomland areas surrounding the mountain range, none of the watercourses and flow paths/drainage lines possess any distinct riparian zones or significant variations in vegetation species composition or structure, relative to the surrounding terrestrial landscape. Merely slight to moderate increases in density of woody shrub individuals are evident within- and along the edges of the significant watercourses.

No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. The development design layouts of the proposed wind turbine access/service road network and the 33 kV transmission line network with its access/service road network, throughout the mountaintop plateaus as well as the proposed main site access/service road and the 132 kV transmission line with its access/service road throughout the flat bottomland areas and transitional zone, must allow for continued flow through the relevant watercourses and flow paths/drainage lines. This must be done in order to maintain/ensure their ecological functionality and integrity over time. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.

An adequate Stormwater and Erosion Management Plan must also be implemented during the construction- and operational phases of the proposed development, in order to assist with the water channelling and allow for continued flow within the local catchment. This must be done to sufficiently manage storm water runoff and clean/dirty water separation in order to attempt to maintain/ensure the ecological functionality and integrity of the local and broader quaternary surface water catchment- and drainage area.

A Water Use License Application (WULA) must furthermore be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the six (6) drainage line/flow path- and watercourse crossings, associated with the mountaintop plateaus as well as through the approximately sixty-one (61) watercourse- and drainage line/flow path crossings, associated with the flat bottomland areas and transitional zone, in accordance with the National Water Act (Act 36 of 1998).

Current Existing Vegetation and Site Description

The three mountaintop plateaus all constitute relatively homogenous, flat to slightly undulating grassy karroid shrubland landscapes. Merely slight variations in vegetation species composition and representation are evident throughout certain areas. These variations are however deemed negligible in the ecological context of the landscape.

The applicant intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. **It is therefore recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.**

The flat bottomland areas form part of an extensive intertwined mosaic of mainly karroid shrubland landscape and to a lesser extent, karroid shrubby grassland landscape. The majority of the 132 kV electrical transmission line and its associated access/service road, will however traverse a significantly undulating transitional zone between the mountaintop plateaus and the flat bottomland areas surrounding the mountain range.

The mountaintop plateaus and the flat bottomland areas are mainly utilised by commercial farmers as well as local informal subsistence farmers/land users for livestock grazing purposes. The ecology of the landscape is in a predominantly natural and functional state, although slight disturbance as a result of historic and continued long-term overgrazing, is evident throughout certain areas of the mountaintop plateaus and the majority of the flat bottomland areas. **It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.**

Red Data Listed-, nationally protected- and other provincially protected plant species

A significant increase in soil surface rockiness and associated shallower soils are evident all along the outer perimeters and cliffs of the mountaintop plateaus. Such areas are also mainly associated with increased slope gradients towards the cliffs. These areas possess different and locally distinct vegetation species composition and -structure, with higher succulent- and conservationally significant species diversity, relative to the majority grassy karroid shrubland landscape of the mountaintop plateaus. The presences of the provincially protected species *Euphorbia avasmontana* as well as the provincially specially protected species *Aloe dichotoma* are significantly more prominent throughout such areas, while habitat-specific succulent species such as the two provincially protected species *Cotyledon orbiculata* and *Euphorbia mauritanica*, are diagnostically confined to such areas. Numerous clusters of the provincially protected species *Ammocharis coranica* were furthermore found at the initial laydown area location of wind turbine number B22, which forms part of the outer perimeter and cliff of the mountaintop plateau.

Due to the increased soil surface rockiness and associated different vegetation species composition and -structure, these outer perimeters and cliffs of the mountaintop plateaus also possess locally distinct and important faunal habitat attributes/features. It is therefore reasonably expected that such areas are likely utilised by various common and habitat-specific faunal (reptilian and mammalian) species as refuge and for breeding, foraging and persistence purposes.

Three (3) clusters of the provincially protected species *Euphorbia avasmontana* were found to be present along the proposed access/service road portions towards wind turbine numbers B02 & D05. Four (4) clusters of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B03, B07, B09 & D01, respectively. This equates to a total of seven (7) *Euphorbia avasmontana* clusters, which are associated with the proposed wind power development footprint areas.

Merely a single (1) cluster of the provincially protected species *Euphorbia avasmontana* was found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

Three (3) individuals of the provincially specially protected species *Aloe dichotoma* were found to be present along the proposed access/service road portions towards wind turbine numbers B02, B03 & B12. Single individuals of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B01, B09 & B22, respectively. This equates to a total of six (6) *Aloe dichotoma* individuals, which will have to be destroyed/removed for the proposed wind power development.

Two (2) individuals of the provincially specially protected species *Aloe dichotoma* were also found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

The grassy karroid shrubland landscape of the mountaintop plateaus, are also sparsely covered by individuals of the nationally protected tree species *Boscia albitrunca*. The average density of this species throughout the mountaintop plateaus, was calculated to be approximately 4 individuals/ha. A minimum counted estimate of approximately 110 individuals were found to be present throughout the approximately 33.64 ha associated with the proposed wind turbine laydown areas and electrical combiner footprint areas as well as throughout the access/service road networks. These individuals will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height). Merely six (6) individuals of ≥ 2 m in height and a further nine (9) significantly sized individuals (≥ 3 m in height) were found to be present within close proximity to the proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The karroid shrubland- and karroid shrubby grassland landscapes of the flat bottomland areas, are also extensively covered by individuals of the nationally protected tree species *Boscia albitrunca*. The significantly undulating transitional zone associated with the majority of the proposed transmission line and its associated access/service road, is also sparsely covered by this species. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included) and 4 m in width, will respectively be cleared of vegetation for the entire proposed main site access/service road and the access/service road associated with the transmission line. They will also be maintained as such, over time.

Minimum counted estimates of approximately 160 and 100 individuals were respectively found to be present along the proposed main site access/service road- as well as the proposed transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range. This equates to a total of approximately 260 *Boscia albitrunca* individuals, which will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height), while merely fifteen (15) individuals of ≥ 2 m in height and a further ten (10) significantly sized individuals (≥ 3 m in height) were found to be present along the proposed main site access/service road route. A further nine (9) individuals of ≥ 2 m in height and a single (1) significantly sized individual (≥ 3 m in height) were also found to be present along the proposed transmission line and its associated access/service road route.

The provincially protected species *Jamesbrittenia incisa*, *Ruschia spinosa* and *R hamata* were merely found to be sparsely present, while a single cluster of the provincially protected species *Aloe claviflora* was found to be present along the proposed access/service road portion towards wind turbine number B10.

Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were also found to be present in close proximity to the initially proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The provincially protected species *Euphorbia mauritanica* was found to be well-represented throughout the flat bottomland areas, while the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* were merely found to be sparsely present. Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were found to be present along the proposed main site access/service road route. A further seven (7) individuals of this species were also found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. This equates to a total of ten (10) *Hoodia gordonii* individuals.

Apart from the species discussed above, no Red Data Listed-, other nationally protected- or other provincially protected plant species or any other plant species of conservational significance/value, were found to be present throughout any of the proposed development areas, associated with the three mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range.

A Moratorium is currently in place in the Northern Cape Province, that prohibits the destruction/removal of *Aloe dichotoma* individuals. It is therefore recommended that all of the identified eight (8) *Aloe dichotoma* individuals must be left intact. The identified individuals associated with the wind turbine laydown areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 10 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.

It is recommended that the outer perimeters and cliffs of the mountaintop plateaus be adequately buffered out of the proposed development footprint areas. No current or future development is allowed to take place within such buffered zones. Based on this recommendation along with the specific presences of clusters and individuals of the provincially protected species *Euphorbia avasmontana*, *Cotyledon orbiculata*, *Euphorbia mauritanica* and *Ammocharis coranica* as well as the provincially specially protected species *Aloe dichotoma*, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these ecologically/conservationally significant/sensitive areas and -species individuals:

- B01, B03, B07, B09, B15 & B22
- D01
- F03

The access/service road associated with the proposed 132 kV transmission line, must be adequately diverted around the identified *Euphorbia avasmontana* cluster, associated with the flat bottomland areas and transitional zone surrounding the mountain range. This must be done in order to attempt to ensure its continued subsistence and longevity.

A Protected Tree License has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any nationally protected tree species individuals. It is however recommended that all of the identified thirty (30) *Boscia albitrunca* individuals of $\geq 2\text{m}$ in height and the identified twenty-one (20) significantly sized *Boscia albitrunca* individuals ($\geq 3\text{m}$ in height), must be left intact. The identified individuals associated with the wind turbine laydown areas and electrical combiner footprint areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 15 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the main site access/service road and the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity. Based on this recommendation, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these locally significant nationally protected tree individuals:

- B21, B23
- Northern electrical combiner

It is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed removal/destruction of nationally protected tress species individuals.

A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified provincially protected species individuals. It is however recommended that the single cluster of the identified provincially protected species *Aloe claviflora*, must be adequately relocated to another suitable and similar area as to where it was removed from. It is also recommended that representative numbers of individuals/clusters of the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* as well as all ten (10) identified individuals of the provincially specially protected species *Hoodia gordonii* identified throughout the flat bottomland areas and transitional zone surrounding the mountain range, must be adequately relocated to another suitable and similar area as to where they were removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced ecologist.

Due to the subsequent relocation of certain wind turbines and their laydown areas as discussed earlier above, it is however not anticipated that the identified *Hoodia gordonii* individuals associated with the mountaintop plateaus, will be directly affected by the proposed development. It is therefore recommended that they must be left intact. The proposed access/service road portion towards wind turbine number D05, must also be adequately diverted around the single identified individual, which was found to be present there.

Fauna and Avifauna

This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed wind power development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development area.

No conservationally significant or important faunal species or locally distinct faunal habitats were observed throughout the mountaintop plateaus or the flat bottomland areas and transitional zone surrounding the mountain range. Due to the undeveloped relatively natural state of the mountaintop plateaus as well as the flat bottomland areas and transitional zone, it is however reasonably expected that the local and broader area will likely be utilised by various common reptilian-, small antelope- as well as meso-predatory- and other mammalian species as refuge and for breeding, foraging and persistence purposes. The mobility of faunal species along with the vast, continuous undeveloped surrounding natural landscape, allows for faunal individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

Conclusion

The mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range, both scored moderate Ecological Importance and Sensitivity (EIS) values and are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

Destruction of-/damage to Red Data Listed, nationally- and/or provincially protected species individuals/habitats associated with the assessment area, terrestrial and aquatic alien invasive species establishment throughout the flat bottomland areas and transitional zone surrounding the mountain range as well as impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as significant potential long-term ecological impact, associated with the construction phase of the proposed development.

Continued impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area was furthermore identified and addressed as a continued significant potential long-term ecological impact, associated with the operational phase of the proposed development.

Although the broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape, the proposed development merely forms a small part of the first phase of a significantly sized and extensive renewable energy power generating hub, which is envisaged for the broader area to the south of the town of Prieska, over time. Significant future development expansion and subsequent transformation in the same geographical area, which could likely lead to further cumulative ecological impacts, will therefore in all probability take place within the local and broader area, over time.

The significant potential long-term ecological impacts identified for the proposed development, could therefore potentially add moderate cumulative impact to the existing and anticipated future negative impacts, associated with the envisaged significantly sized and extensive renewable energy power generating hub, over time.

It is however the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential cumulative ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures. It is therefore not anticipated that the proposed development will add any significant residual cumulative ecological impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report are adequately implemented and managed, for both the construction- and operational phases of the proposed development.

It is the opinion of the specialist that the proposed development of the assessment areas should be considered by the competent authority, for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

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Abbreviations

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
MAP	Mean Annual Precipitation
NCPSBP	Northern Cape Provincial Spatial Biodiversity Plan 2016
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMA	National Environmental Management Act (Act 107 of 1998)
NFA	National Forests Act (Act 84 of 1998)
NWA	National Water Act (Act 36 of 1998)
ONA	Other Natural Area
PES	Present Ecological State
WULA	Water Use License Application

Declaration of Independence

I, Adriaan Johannes Hendrikus Lamprecht, ID 870727 5043 083, declare that I:

- am the Director and Ecological Specialist of EcoFocus Consulting (Pty) Ltd
- act as an independent specialist consultant in the field of botany and ecology
- am assigned as the Ecological Specialist consultant by the Environmental Assessment Practitioner (EAP), Green Box Consulting, for the proposed development
- do not have or will not have any financial interest in the undertaking of the proposed project activity other than remuneration for work as stipulated in the Purchase Order terms of reference
- confirm that remuneration for my services relating to the proposed development is not linked to approval or rejection of the project by the competent authority
- have no interest in secondary or subsequent developments as a result of the authorisation of the proposed project
- have no and will not engage in any conflicting interests in the undertaking of the activity
- undertake to disclose to the applicant and the competent authority any information that has or may have the potential to influence the decision of the competent authority
- will provide the applicant and competent authority with access to all relevant project information in my possession whether favourable or not

AJH Lamprecht



Signature

1. Introduction

The project applicant, Prieska Power Reserve (Pty) Ltd, proposes to formally develop vacant portions of land on top of a significantly sized mountain range, for a 224.4 MW wind turbine power generation facility outside the town of Prieska, Northern Cape Province. The mountain range consists of three separate but connected mountaintop plateaus. The proposed development on these mountaintop plateaus will constitute the construction of the following infrastructure:

- Thirty-four (34) separate wind turbines and associated laydown areas
- Wind turbine access/service road network
- 33 kV electrical transmission line- and its associated access/service road network
- Two (2) electrical combiners

The following infrastructure will also be constructed throughout the flat bottomland areas, surrounding the mountain range as well as the transitional zone between the flat bottomland areas and the mountain range:

- Main site access/service road which will connect the proposed development to the existing provincial road network
- A single 132 kV electrical transmission line and its associated access/service road, which will mostly run parallel to an existing ESKOM line, but will not tie into the ESKOM electrical grid at any point.
- A temporary equipment and construction materials laydown area will also be cleared within the flat bottomland area at the foot of the mountain range, from where access to the three mountaintop plateaus will be obtained
- A security gate and subsequent security corridor

Green Box Consulting was appointed by CENEC (Pty) Ltd (applicant representatives) as the independent Environmental Assessment Practitioner (EAP), to conduct the legally required Ecological Impact Assessment (EIA) process.

Due to the nature of potential ecological impacts posed by the proposed development to the local ecosystem and ecology, an Ecological study is required. This is required in order to determine the potential presence of ecologically/conservationally significant or sensitive species, habitats, wetlands or ecosystems, which may be adversely affected by the proposed development. Any potential ecological impacts associated with the proposed development, must be identified. Impact mitigation and management measures in accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) Mitigation Hierarchy, must subsequently be recommended. This must be done in order to attempt to reduce/alleviate the adverse effects of identified potential ecological impacts.

EcoFocus Consulting was therefore consequently appointed by the EAP as the independent ecological specialist, to conduct the required Ecological study for the proposed development. This report constitutes the Ecological Assessment.

Preliminary preparations conducted prior to the ecological site assessment, were as follows:

- Georeferenced spatial information was obtained of the proposed development areas, in order to determine the direct impact footprint area.
- A desktop study was conducted of the most up-to-date information/data available on the relevant vegetation types and national/provincial conservation significance status, associated with the proposed development areas.

2. Date of Ecological Site Assessment

Site assessments for the proposed development areas throughout the flat bottomland areas and transitional zone surrounding the mountain range, were conducted on 30 & 31 August 2021. These dates form part of the commencement of the new growing season. At the time of the site assessments, the area had however not received adequate initial rainfall yet. It must therefore be noted that the timing of the assessments was not necessarily favourable for successful identification of all plant species individuals.

Site assessments for the proposed development areas throughout the mountaintop plateaus, were conducted on 04, 05 & 06 April 2022. These dates form part of the growing season and most plant species present, could therefore be successfully identified. It must however be noted that the timing of the assessments was not necessarily favourable for successful identification of underground bulb plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted, prior to the commencement of the proposed development, during the flowering period of underground bulb plant species. This will ensure that no provincially protected or other conservationally significant plant species have potentially been omitted.

3. Assessment Rational

South Africa is a country rich in natural resources and splendour and is rated as having some of the highest biodiversity in the world. Other than the pure aesthetic value which our biodiversity and natural resources provides, it also plays a significant positive role in our national economy. While continuous economic development and progress is a key national focus area, which forms a cornerstone in the socio-economic improvement of society and the livelihoods of communities and individuals, the preservation and management of the integrity and sustainability of our natural resources is also essential in achieving this objective.

Socio-economic development and progress can therefore not be completely inhibited for the sake of ensuring environmental conservation; solutions and compromises rather need to be explored in order to achieve the need for socio-economic development without unreasonably jeopardising the needs of environmental conservation. A sustainable and responsible balance needs to be maintained in order to accommodate the requirements of both.

Adequate, sustainable and responsible utilisation and management of our natural resources is crucial. Finding the required balance between socio-economic development and environmental conservation, should therefore always be a priority focus point during any proposed development process.

Various environmental legislation in South Africa makes provision for the protection of our natural resources and the functionality of ecological systems in order to ensure sustainability. Such acts include the National Environmental Management: Biodiversity Act (Act 10 of 2004), National Forests Act (Act 84 of 1998), Conservation of Agricultural Resources Act (Act 43 of 1983), National Water Act (Act 36 of 1998) and framework legislation such as the National Environmental Management Act (Act 10 of 2004).

An Ecological Assessment of the proposed development areas was therefore conducted in order to identify and quantify any potential ecological impacts, associated with the proposed development.

4. Objectives of the Assessment

- Describe the vegetation within the assessment area and identify and list conservationally significant faunal and floral species encountered within the assessment area.
 - List any nationally- and/or provincially protected- and/or Red Data Listed species.
- Identify and discuss any ecologically sensitive/conservationally significant areas, if potentially found to be present within the assessment area.
- Identify, delineate and discuss any watercourses/wetlands, if potentially found to be present within the assessment area.
- Assess and discuss the Present Ecological State (PES) of the assessment area and directly surrounding areas, in order to provide an indication of the current ecological condition as well as the extent and severity of degradation and/or transformation of the assessment area, if applicable.
- Assess and discuss the Ecological Importance and Sensitivity (EIS) of the assessment area and directly surrounding areas, in order to provide an indication of the ecological sensitivity/conservational significance of the assessment area.
- Identify, evaluate, rate and discuss any potential ecological impacts associated with the proposed development.
 - Provide recommendations on impact mitigation and management measures in accordance with the requirements of the NEMA (Act 107 of 1998) Mitigation Hierarchy, in order to attempt to reduce/alleviate the adverse effects of identified potential ecological impacts.
- Provide recommendations on the ecological suitability/acceptability of the assessment area for the proposed development.
- A digital report (this document) as well as digital .KML files are also provided to the EAP, of any ecologically sensitive/conservationally significant areas and/or watercourses/wetlands, if potentially identified within the assessment area.

5. Methodology

- The proposed development areas were assessed on foot and with the use of a vehicle.
- Visual observations/identifications were made of habitat conditions, any ecologically sensitive/conservationally significant areas as well as relevant species present.
- Identified species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 as well as the Provincially Protected species of the Northern Cape Nature Conservation Act (Act 9 of 2009).
- Watercourses/wetlands which are potentially present within the assessment area, were identified, delineated and discussed as per the methodology described below:
 - For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (Act 36 of 1998) as: “land which is transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface, or the land is periodically covered with shallow water and which in normal circumstances, supports or would support vegetation typically adapted to life in saturated soil.”
 - In 2005 DWAF published a wetland delineation procedure in a guideline document titled “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas”. Guidelines for the undertaking of biodiversity assessments exist. These guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments.
 - The wetland delineation procedure identifies the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas. This constitutes the part of the wetland that might remain flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.
 - The guidelines also state that the locating of the outer edge of the temporary zone must make use of four specific indicators namely:
 - terrain unit indicator
 - soil form indicator
 - soil wetness indicator
 - vegetation indicator

- In addition, the watercourse/wetland and a protective buffer zone beginning from the outer edge of the wetland temporary zone, was designated as sensitive in a sensitivity map. The guidelines stipulate buffers to be delineated around the boundary of a wetland. An adequate protective buffer zone, beginning from the outer edge of the wetland temporary zone, was implemented and designated as sensitive within which no development must be allowed to occur.
- Georeferenced photographs were taken of any ecologically sensitive/conservationally significant areas, watercourses/wetlands as well as any Red Data Species Listed-, nationally- or provincially protected species if encountered, in order to indicate their specific locations in a Geographic Information System (GIS) mapping format.

The **Present Ecological State (PES)** of the assessment area was determined and discussed as per the table below.

- The Present Ecological State (PES) refers to the current state or condition of an area in terms of all its characteristics and reflects the change to the area from its reference condition. The value gives an indication of the alterations that have occurred in the ecosystem.

Table 1: Criteria for PES calculations

Ecological Category	Score	Description
A	> 90-100%	Unmodified , natural and pristine.
B	> 80-90%	Largely natural . A small change in natural habitats and biota may have taken place but the ecosystem functionality has remained essentially unchanged.
C	> 60-80%	Moderately modified . Moderate loss and transformation of natural habitat and biota have occurred, but the basic ecosystem functionality has still remained predominantly unchanged.
D	> 40-60%	Largely modified . A significant loss of natural habitat, biota and subsequent basic ecosystem functionality has occurred.
E	> 20-40%	Seriously modified . The loss of natural habitat, biota and basic ecosystem functionality is extensive.
F	0-20%	Critically/Extremely modified . Transformation has reached a critical level and the ecosystem has been modified completely with a virtually complete loss of natural habitat and biota. The basic ecosystem functionality has virtually been destroyed and the transformation is irreversible.

The **Ecological Importance and Sensitivity (EIS)** of the assessment area was determined and discussed as per the table below.

- The Ecological Importance and Sensitivity (EIS) of an area is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. Both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance, once it has occurred.

Table 2: Criteria for EIS calculations

EIS Categories	Score	Description
Low/Marginal	D	Not ecologically important and/or sensitive on any scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.
Moderate	C	Ecologically important and sensitive on local or possibly provincial scale. Biodiversity is still relatively ubiquitous and not usually sensitive to habitat modifications.
High	B	Ecologically important and sensitive on provincial or possibly national scale. Biodiversity is relatively unique and may be sensitive to habitat modifications.
Very High	A	Ecologically important and sensitive on national and possibly international scale. Biodiversity is very unique and sensitive to habitat modifications.

Potential ecological impacts posed by the proposed development to the local ecosystem and ecology, were identified, evaluated, rated and discussed as per the methodology described below. The tables below indicate and explain the methodology and criteria used for the evaluation of the Environmental Risk Ratings as well as the calculation of the final Environmental Significance Ratings of the identified potential ecological impacts. Each identified potential ecological impact is scored for each of the Evaluation Components, as per the table below.

Table 3: Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/Criteria
Magnitude of Negative or Positive Impact	<p>10 - Very high: Bio-physical features and/or ecological functionality/processes may be severely impacted upon.</p> <p>8 - High: Bio-physical features and/or ecological functionality/processes may be significantly impacted upon.</p> <p>6 - Medium: Bio-physical features and/or ecological functionality/processes may be moderately impacted upon.</p> <p>4 - Low: Bio-physical features and/or ecological functionality/processes may be slightly impacted upon.</p> <p>2 - Very Low: Bio-physical features and/or ecological functionality/processes may be slightly impacted upon.</p> <p>0 - Zero: Bio-physical features and/or ecological functionality/processes will not be impacted upon.</p>
Duration of Negative or Positive Impact	<p>5 – Permanent: Impact will continue on a permanent basis.</p> <p>4 - Long term: Impact should cease a period (> 40 years) after the operational phase/project life of the activity.</p> <p>3 - Medium term: Impact may occur for the period of the operational phase/project life of the activity.</p> <p>2 - Short term: Impact may only occur during the construction phase of the activity after which it will cease.</p> <p>1 - Immediate: Impact may only occur as a once off during the construction phase of the activity.</p>
Extent of Positive or Negative Impact	<p>5 - International: Impact will extend beyond National boundaries.</p> <p>4 - National: Impact will extend beyond Provincial boundaries but remain within National boundaries.</p> <p>3 - Regional: Impact will extend beyond 5 km of the development footprint but remain within Provincial boundaries.</p> <p>2 - Local: Impact will not extend beyond 5 km of the development footprint.</p> <p>1 - Site-specific: Impact will only occur on or within 200 m of the development footprint.</p> <p>0 – No impact.</p>
Irreplaceability of Natural Resources being impacted upon	<p>5 – Definite loss of irreplaceable natural resources.</p> <p>4 – High potential for loss of irreplaceable natural resources.</p> <p>3 – Moderate potential for loss of irreplaceable natural resources.</p> <p>2 – Low potential for loss of irreplaceable natural resources.</p> <p>1 – Very low potential for loss of irreplaceable natural resources.</p> <p>0 – No impact.</p>

Reversibility of Impact	<p>5 – Impact cannot be reversed.</p> <p>4 – Low potential that impact may be reversed.</p> <p>3 – Moderate potential that impact may be reversed.</p> <p>2 – High potential that impact may be reversed.</p> <p>1 – Impact will be reversible.</p> <p>0 – No impact.</p>
Probability of Impact Occurrence	<p>5 - Definite: Probability of impact occurring is > 95 %.</p> <p>4 - High: Probability of impact occurring is > 75 %.</p> <p>3 - Medium: Probability of impact occurring is between 25 % - 75 %.</p> <p>2 - Low: Probability of impact occurring is between 5 % - 25 %.</p> <p>1 - Improbable: Probability of impact occurring is < 5 %.</p>
Cumulative Impact	<p>High: Numerous similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts.</p> <p>Medium: Few similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts.</p> <p>Low: Virtually no similar historic, present or future development activities in the same geographical area, have taken or are anticipated to take place which may cumulatively contribute and increase the significance of the identified impacts. The development is anticipated to be an isolated occurrence and should therefore have a negligible cumulative impact.</p> <p>None: No cumulative impact.</p>

Once the Environmental Risk Ratings have been evaluated for each identified potential ecological impact, the Significance Score of each impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**
- **The maximum Significance Score value is 150.**

The Significance Score is then used to rate the Environmental Significance of each identified potential ecological impact, as per Table 4 below. The Environmental Significance rating process is completed for all identified potential ecological impacts for the construction- and subsequent operational phases of the proposed development, both before and after implementation of the recommended mitigation measures.

Table 4: Scale used for the evaluation of the Environmental Significance Ratings

Environmental Significance Score	Environmental Significance Rating	Description/Criteria
125 – 150	Very High	An impact of very high significance after mitigation will mean that the development may not take place. The impact cannot be suitably reduced and mitigated to within acceptable levels.
100 – 124	High	An impact of high significance after mitigation should influence a decision about whether or not to proceed with the development. Additional, impact-specific mitigation measures must be implemented if the continuation of the development is to be considered.
75 – 99	Medium-High	Additional, impact-specific mitigation measures must be implemented for an impact of medium-high significance if the continuation of the development is to be considered.
50 – 74	Medium	An impact of medium significance after mitigation must be adequately managed in accordance with the mitigation measures provided by the specialist.
< 50	Low	If any mitigation measures are provided by the specialist for an impact of low significance after mitigation, the impact must be adequately managed in accordance with these measures.
+	Positive impact	A positive impact is likely to result in a beneficial consequence/effect and should therefore be viewed as a motivation for the development to proceed.

6. Assessment Area

The assessment areas are situated approximately 10 km south-east of the town of Prieska. The town forms part of the Siyathemba Local Municipality which in turn, forms part of the Pixley Ka Seme District Municipality, Northern Cape Province. Access to the assessment areas is obtained by way of the R 357 provincial road and subsequent dirt roads, from the west.

The proposed development on the three separate but connected mountaintop plateaus will constitute the construction of the following infrastructure:

- Thirty-four (34) separate wind turbines and associated laydown areas of approximately 80 m x 125 m (0.96 ha) in size each
 - This equates to a combined total footprint area of approximately 32.64 ha in size
- Wind turbine access/service road network
 - Significant portions of the proposed access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road network. It will also be maintained as such, over time.
- 33 kV electrical transmission line- and its associated access/service road network
 - The transmission line network servitudes will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. They will also be maintained as such, over time.
 - Significant portions of the proposed access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear farm tracks of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission lines, for the entire proposed access/service road network. They will also be maintained as such, over time.
- Two (2) electrical combiners of approximately 0.5 ha in size each
 - This equates to a combined total footprint area of approximately 1 ha in size

- The three mountaintop plateau assessment areas are situated on the following properties:
 - Portions 2 & 11 of the Farm Prieskas Poort No. 51 (SG 21 Digit Codes: C06000000000005100002 & C06000000000005100011)
 - Portions 3, 4, 8 & 9 of the Farm Karabee No. 50 (SG 21 Digit Codes: C06000000000005000003, C06000000000005000004, C0600000000005000008 & C06000000000005000009)
 - Portion 12 of the Farm T` Keikams Poort No. 71 (SG 21 Digit Code: C06000000000007100012)

The following infrastructure will also be constructed throughout the flat bottomland areas, surrounding the mountain range as well as the transitional zone between the flat bottomland areas and the mountain range:

- Main site access/service road which will connect the proposed development to the existing provincial road network
 - Virtually the entirety of the proposed access/service road constitutes existing farm tracks, while certain new road portions will also be constructed. A narrow linear physical footprint section of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road. It will also be maintained as such, over time.
- A single 132 kV electrical transmission line and its associated access/service road, which will mostly run parallel to an existing ESKOM line, but will not tie into the ESKOM electrical grid at any point
 - The transmission line servitude will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. It will also be maintained as such, over time.
 - Significant portions of the proposed access/service road constitute existing farm tracks, while certain new road portions will also be constructed. A narrow linear farm track of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission line, for the entire proposed access/service road. It will also be maintained as such, over time.

- A temporary equipment and construction materials laydown area of approximately ≤ 1 ha in size, will also be cleared within the flat bottomland area at the foot of the mountain range, from where access to the three mountaintop plateaus will be obtained
- A security gate and subsequent security corridor of approximately 0.6 ha in combined total size
- The flat bottomland and transitional zone assessment areas are situated on the following properties:
 - Remaining Extent of Erf 1 of the town of Prieska (RE/1)
 - Portions 1 & 11 of the Farm Prieskas Poort No. 51 (SG 21 Digit Codes: C0600000000005100001 & C0600000000005100011)

See the two locality maps below (see A3 sized maps in the Appendices). Locality Map 1 includes the wind turbine access/service road network and the main site access/service road. Locality Map 2 includes the 33 kV electrical transmission line network, the 132 kV electrical transmission line and the two electrical combiners.

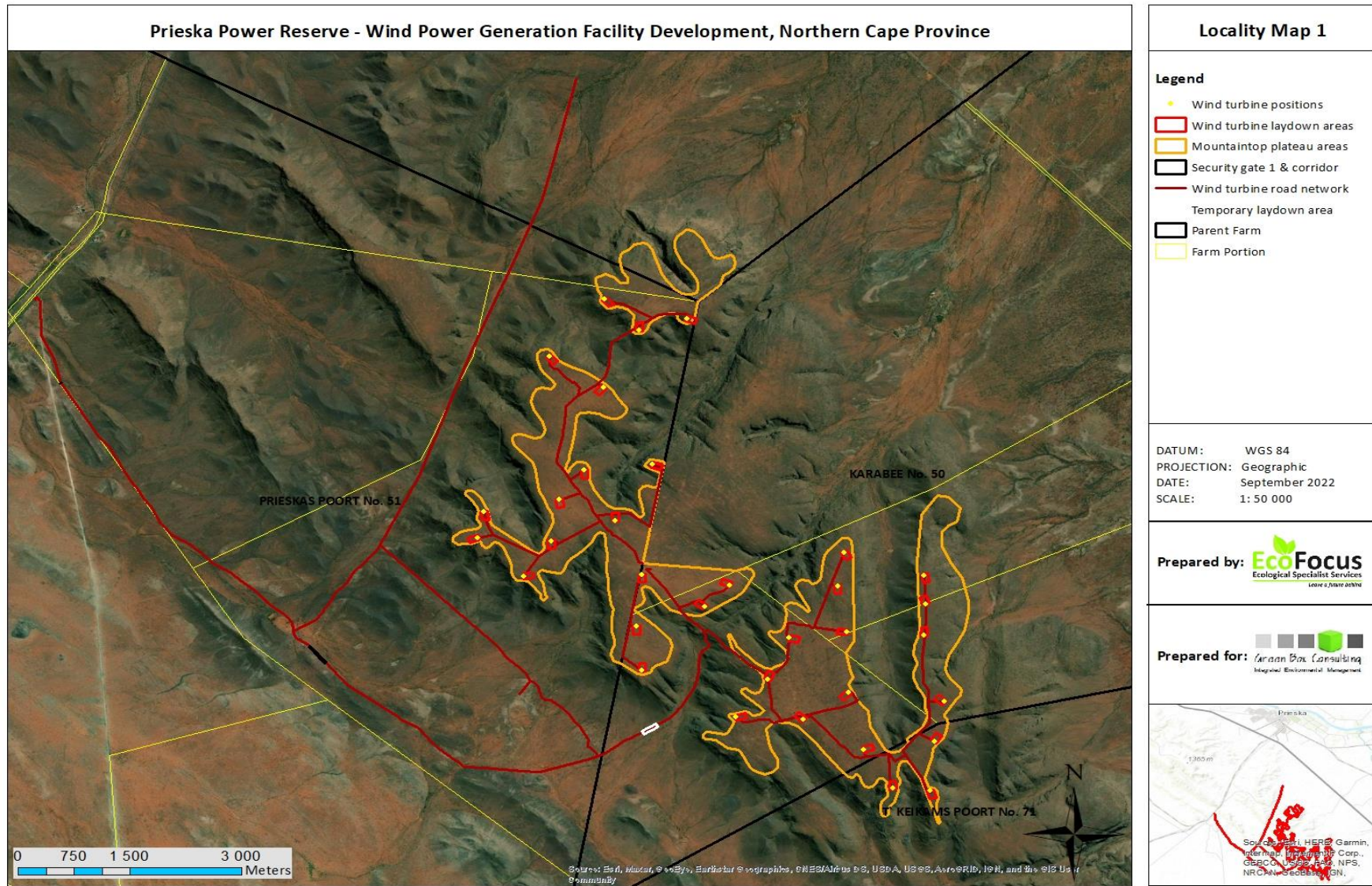


Figure 1: Locality map 1 illustrating the assessment areas

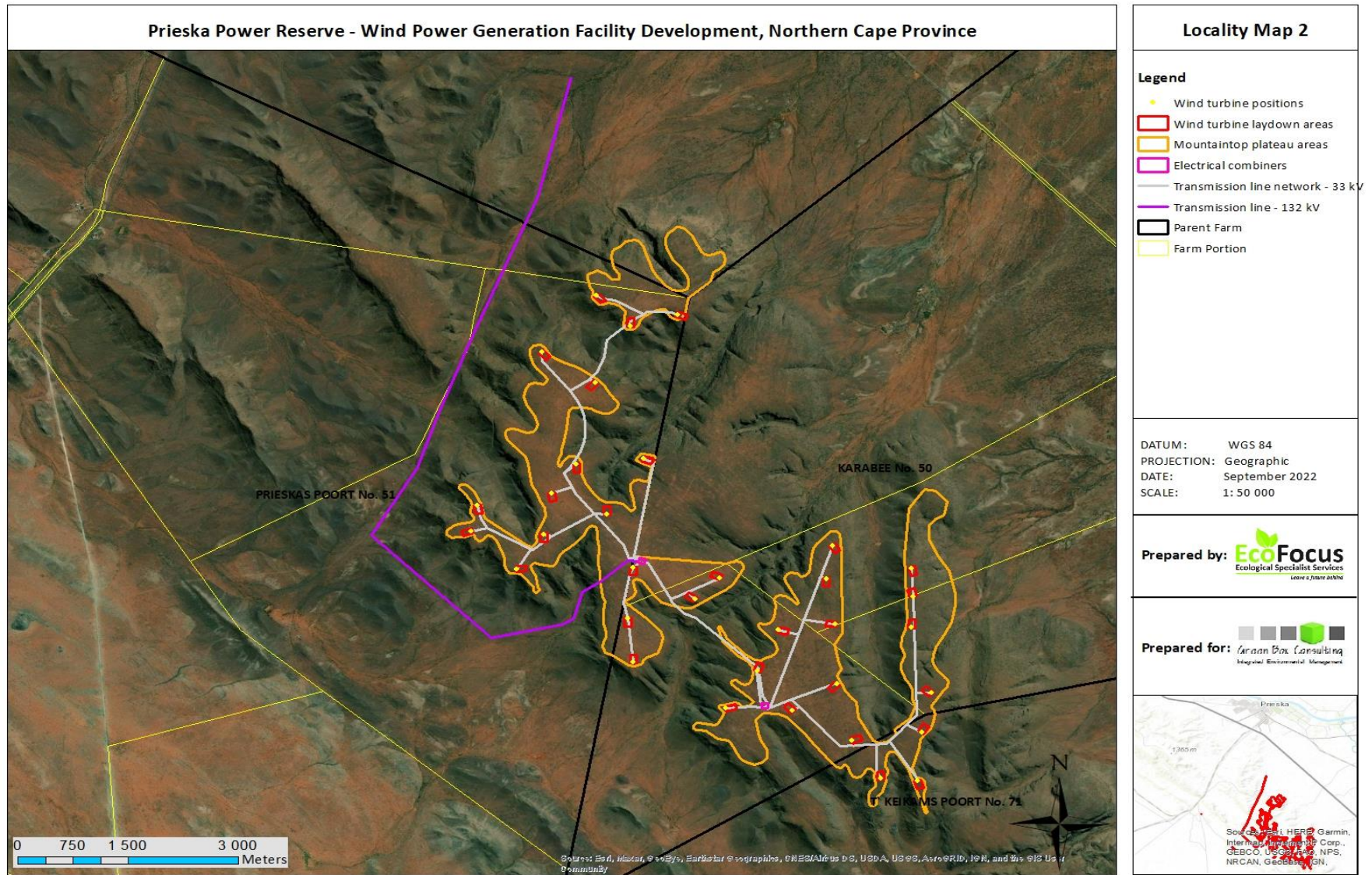


Figure 2: Locality map 2 illustrating the assessment areas

6.1. Climate

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is approximately 244 mm (www.climate-data.org). The maximum average monthly temperature is approximately 26.9°C in the summer months while the minimum average monthly temperature is approximately 9.8°C during the winter (www.climate-data.org). Maximum daily temperatures can reach up to 34.6°C in the summer months and dip to as low as 1°C during the winter (www.climate-data.org).

6.2. Geology and Soils

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation types can be described as the following:

The three mountaintop plateau assessment areas have a complicated geology: banded iron formation and amphibolites of the Asbestos Hills Subgroup. Metamorphic rocks of the Mokolian Erathrem include quartzites and gneisses of the Korannaland Supergroup. Soils are shallow and skeletal (Mispah and Glenrosa are dominant), mainly of Ib and Ic land types.

The flat bottomland assessment areas surrounding the mountain range, are mainly covered by recent alluvium and calcrete. Superficial deposits of the Kalahari Group are also present. Soils are mostly red-yellow apedal and free-draining, mainly of Ag and Ae land types.

6.3. Vegetation Type and Conservation Status

Vegetation Type

According to SANBI (2006-2019), the three mountaintop plateau assessment areas form part of the Lower Gariep Broken Veld vegetation type (NKb 1), which mainly consists of hills and low mountains, slightly irregular plains with some rugged terrain. The sparse vegetation is mainly dominated by shrubs and dwarf shrubs with perennial grasses and herbs. Groups of scattered low trees such as *Aloe dichotoma* and *Senegalia mellifera* occur on slopes of koppies and on sandy soils of foot slopes. This vegetation type is classified as Least Concerned (SANBI, 2006-2019).

The flat bottomland assessment areas surrounding the mountain range, however fall within the Bushmanland Arid Grassland vegetation type (NKb 3). This vegetation type mainly consists of extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland and mostly dominated by white grasses such as *Stipagrostis* species (SANBI, 2006-2019). The vegetation type has the characteristics of semi desert (SANBI, 2006-2019). This vegetation type is classified as Least Concerned (SANBI, 2006-2019).

Conservation Status

The entirety of the three mountaintop plateau- and the flat bottomland assessment areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. ESA's are areas that must be maintained in at least fair ecological condition (semi-natural/moderately modified state) in order to support the ecological functioning of a Critical Biodiversity Area (CBA) or protected area, or to generate or deliver ecosystem services, or to meet remaining biodiversity targets for ecosystem types or species when it is not possible or not necessary to meet them in natural or near-natural areas (Collins, 2018).

See vegetation type- and conservation status maps below (see A3 sized maps in the Appendices).

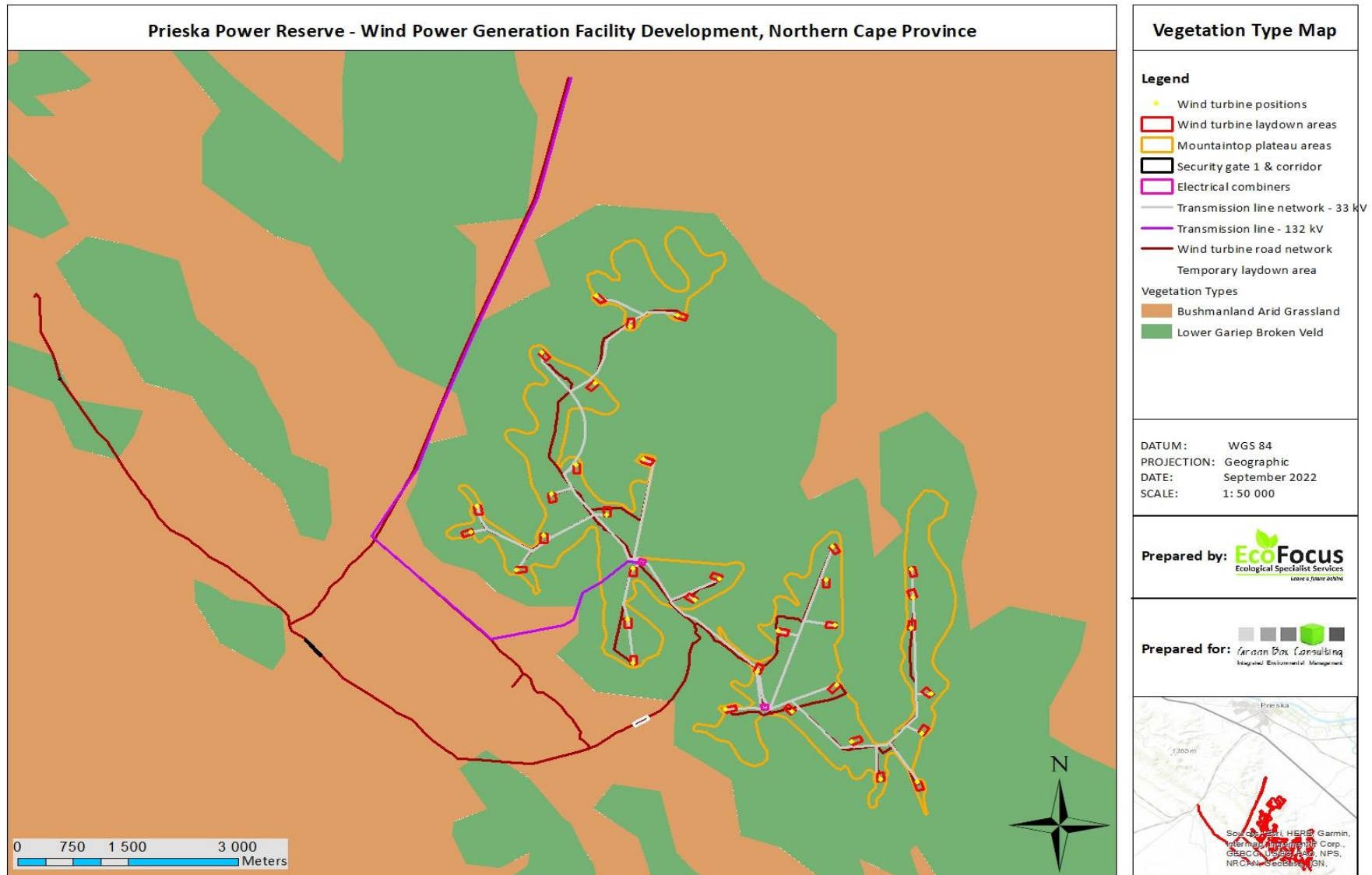


Figure 3: Vegetation type map illustrating the vegetation types associated with the assessment areas

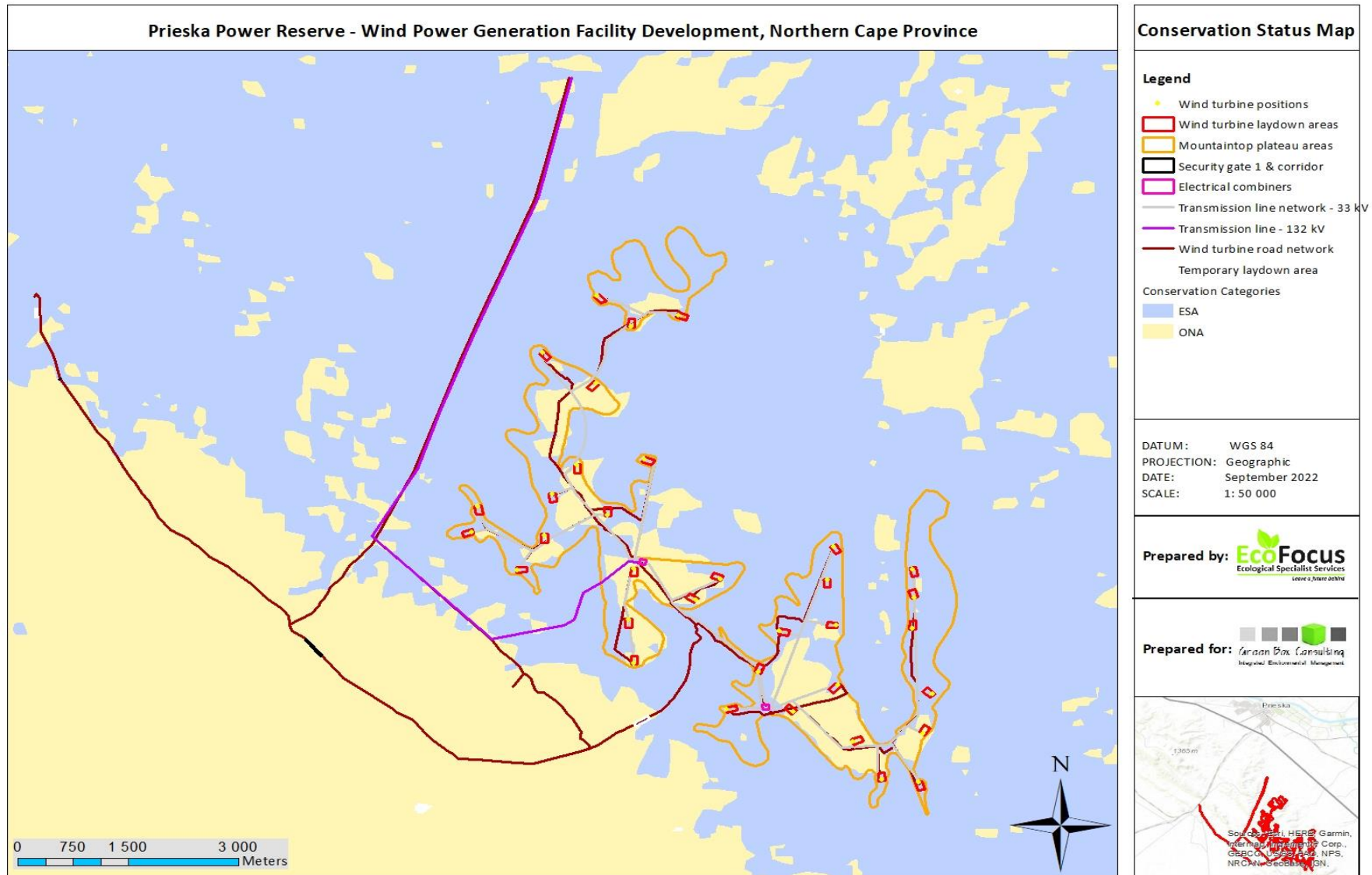


Figure 4: Conservation status map illustrating the conservation statuses/categories associated with the assessment areas

7. Assumptions, Uncertainties and Gaps in Knowledge

Various assumptions need to be made during the assessment process, at the hand of the relevant specialist. It is therefore assumed that:

- all relevant project information provided to the ecological specialist by the EAP, was correct and valid at the time that it was provided.
- the proposed development areas as provided by the EAP, are correct and will not be significantly deviated from, as these were the only areas assessed.
 - the positions of wind turbine laydown area numbers B01 and C01 were only relocated during the end of July 2022 and number C10 during the end of August 2022. These relocated areas were therefore not specifically assessed during the site visits. The three mountaintop plateaus however all constitute relatively homogenous landscapes. It is therefore not expected that there will be any locally distinct ecological features of conservationally significance at the new locations.
- strategic level investigations undertaken by the applicant prior to the commencement of the Environmental Impact Assessment process, determined that the proposed development areas represent potentially suitable and technically acceptable locations.
- the public, local communities, relevant organs of state and surrounding landowners will receive a sufficient reoccurring opportunity to participate and comment on the proposed development during the Environmental Impact Assessment process, through the provision of adequately facilitated public participation interventions and timeframes as stipulated in the NEMA: EIA Regulations, 2014.
- the need and desirability of the proposed development is based on strategic national, provincial and local plans and policies, which reflect the interests of both statutory and public viewpoints.
- the EIA process is a project-level framework and the specialists are limited to assessing the anticipated environmental impacts, associated with the construction and operational phases of the proposed development.
- it is assumed that strategic level decision making by the relevant authorities will be conducted through cooperative governance principles, with the consideration of environmentally sustainable and responsible development principles underpinning all decision making

Given that an EIA involves prediction, the uncertainty factor forms part of the assessment process. Two types of uncertainty are associated with the EIA process, namely process-related and prediction-related.

- Uncertainty of prediction is critical at the data collection phase as observations, recommendations and conclusions are made, solely based on professional specialist opinion. Final certainty will only be obtained upon actual implementation of the proposed development. Adequate research, specialist experience and expertise should however minimise this uncertainty.
- Uncertainty of relevant decision making relates to the interpretation of provided information by relevant authorities during the EIA process. Continual two-way communication and coordination between EAP's and relevant authorities should however decrease the uncertainty of subjective interpretation. The importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant information and impacts is further stressed. The use of quantitative impact significance rating formulas (as utilised in this document) can further standardise the objective interpretation of results and limit the occurrence and scale of uncertainty and subjectivity.
- The principle of human nature provides for uncertainties and unpredictability with regards to the socio-economic impacts of the proposed development and the subsequent public reaction/opinion, which will be received during the Public Participation Process (PPP)

Gaps in knowledge can be attributed to:

- The ecological assessment process was undertaken prior to the availing of certain information, which would only be derived from the final development design and layout. The design layout for the proposed development, had not been finalised yet at the time of the ecological assessment.
- It must be noted that the timing of the assessments was not necessarily favourable for successful identification of underground bulb plant species individuals. It is therefore recommended that an additional ecological walkthrough be conducted, prior to the commencement of the proposed development, during the flowering period of underground bulb plant species. This will ensure that no provincially protected or other conservationally significant plant species have potentially been omitted.
- The proposed development merely forms a small part of the first phase of a significantly sized and extensive renewable energy power generating hub, which is envisaged for the broader area to the south of the town of Prieska, over time.

- Significant future development expansion and subsequent transformation in the same geographical area, which could likely lead to further cumulative ecological impacts, will therefore in all probability take place within the local and broader area, over time.
- The local and broader region surrounding the assessment areas however constitutes a vast, continuous undeveloped natural landscape.
- This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power generation facility development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development areas.

EcoFocus Consulting is an independent ecological specialist company. All information and recommendations as per this report are therefore provided in a fair and unbiased/objective manner and are based on qualitative data gathered as well as professional specialist observation and opinion.

8. Results and Discussion

8.1. Water Catchment and Drainage

An extensive linear topographic highpoint/ridge apex which roughly lies in a north-west to south-east direction, traverses the two southerly situated mountaintop plateaus. This highpoint/ridge apex and subsequently also the mountain range act as a natural linear surface water runoff- and drainage separator, between the portions of the three mountaintop plateaus and surrounding flat bottomland areas situated north and south of the highpoint/ridge apex, respectively. Surface water runoff from the three mountaintop plateaus and surrounding flat bottomland areas consequently mainly drains either in a northerly- or southerly direction, depending on which side of the highpoint/ridge apex the area is situated.

The portions of the mountaintop plateaus situated to the north of the highpoint/ridge as well as the overwhelming majorities of the proposed main site access/service road and 132 kV electrical transmission line with its associated access/service road, fall within the D72A quaternary surface water catchment- and drainage area. The portions of the mountaintop plateaus situated to the south of the highpoint/ridge as well as the most southerly portions of the proposed main site access/service road and 132 kV electrical transmission line with its associated access/service road, however rather fall within the D62H quaternary surface water catchment- and drainage area. The entirety of the three mountaintop plateaus and the flat bottomland areas surrounding the mountain range, fall within the Lower Orange Water Management Area (WMA 14).

The proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, will merely traverse five (5) small ephemeral water drainage lines/preferential flow paths as well as a single significant first-order ephemeral watercourse, throughout the three mountaintop plateaus. These drainage lines/flow paths and single significant watercourse assist with channelling and discharging surface water runoff from small portions of the mountaintop plateaus, towards the surrounding flat bottomland areas. From a hydrological perspective, these drainage lines/flow paths and single significant watercourse therefore merely play a minor assisting role in the local catchment and drainage, associated with surface water runoff from the mountain range. These drainage lines/flow paths and single significant watercourse are therefore not viewed as being of high conservational significance/value, from a hydrological or ecological perspective. It is however not anticipated that the proposed development at these flow path/drainage line- and single significant watercourse crossings, should significantly impede or impact on their flow regimes.

The proposed main site access/service road and the 132 kV electrical transmission line with its associated access/service road, will traverse numerous significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths at approximately sixty-one (61) locations, throughout the flat bottomland areas and transitional zone. These watercourses and drainage lines/flow paths are responsible for a significant portion of the local catchment and drainage, associated with surface water runoff throughout the flat bottomland areas surrounding the mountain range. The significant watercourses therefore form an important part of the local and broader quaternary surface water catchment- and drainage area. It is however not anticipated that the proposed development at these significant watercourse- and flow path/drainage line crossings, should significantly impede or impact on their flow regimes.

Due to the lack of continuous water flow throughout the mountaintop plateaus and flat bottomland areas surrounding the mountain range, none of the watercourses and flow paths/drainage lines possess any distinct riparian zones or significant variations in vegetation species composition or -structure, relative to the surrounding terrestrial landscape. Merely slight to moderate increases in density of woody shrub individuals are evident within- and along the edges of the significant watercourses (see discussions under headings 8.2.1 & 8.3.1).

No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. The development design layouts of the proposed wind turbine access/service road network and the 33 kV transmission line network with its access/service road network, throughout the mountaintop plateaus as well as the proposed main site access/service road and the 132 kV transmission line with its access/service road throughout the flat bottomland areas and transitional zone, must allow for continued flow through the relevant watercourses and flow paths/drainage lines. This must be done in order to maintain/ensure their ecological functionality and -integrity over time. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.

An adequate Stormwater and Erosion Management Plan must also be implemented during the construction- and operational phases of the proposed development, in order to assist with the water channelling and allow for continued flow within the local catchment. This must be done to sufficiently manage storm water runoff and clean/dirty water separation in order to attempt to maintain/ensure the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

A Water Use License Application (WULA) must furthermore be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the six (6) drainage line/flow path- and watercourse crossings, associated with the mountaintop plateaus as well as through the approximately sixty-one (61) watercourse- and drainage line/flow path crossings, associated with the flat bottomland areas and transitional zone, in accordance with the National Water Act (Act 36 of 1998).



Figure 5: Two images illustrating examples of the small ephemeral water drainage lines/preferential flow paths, which will be traversed by the proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, throughout the three mountaintop plateaus



Figure 6: Image illustrating the single significant first-order ephemeral watercourse, which will be traversed by the proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, throughout the three mountaintop plateaus



Figure 7: Three images illustrating examples of the significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths, which will be traversed by the proposed main site access/service road and the 132 kV electrical transmission line with its access/service road, throughout the flat bottomland areas and transitional zone surrounding the mountain range

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8.2. Three Mountaintop Plateaus

The proposed development on the three mountaintop plateaus will constitute the construction of thirty-four (34) separate wind turbines and associated laydown areas (combined total footprint area of approximately 32.64 ha in size), wind turbine access/service road network, 33 kV electrical transmission line- and its associated access/service road network as well as two (2) electrical combiners (combined total footprint area of approximately 1 ha in size).

The mechanical clearance associated with the proposed wind turbine and combiner construction, will in all probability completely transform the majority of the existing surface vegetation throughout each of the wind turbine laydown- and combiner footprint areas. The combined total size of these laydown- and combiner footprint areas is however minute relative to the surface areas of the three mountaintop plateaus. The small laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

Significant portions of the proposed wind turbine access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road network. It will also be maintained as such, over time.

The transmission line network servitudes will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. They will also be maintained as such, over time. Significant portions of the proposed transmission line access/service road network constitute existing farm tracks, while certain new road portions will also be constructed. Narrow linear farm tracks of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission lines, for the entire proposed access/service road network. They will also be maintained as such, over time.

Vegetation clearance must be restricted to the narrow linear sections of the proposed wind turbine access/service road routes as well as the proposed 33 kV transmission line network access/service road routes, as far as practicably possible.

8.2.1. Current Existing Vegetation and Site Description

The three mountaintop plateaus all constitute relatively homogenous, flat to slightly undulating grassy karroid shrubland landscapes. Merely slight variations in vegetation species composition and representation are evident throughout certain areas. These variations are however deemed negligible in the ecological context of the landscape.

The mountaintop plateaus are mainly utilised by commercial farmers for livestock grazing purposes. The ecology of the landscape is in a predominantly natural and functional state, although slight disturbance as a result of historic and continued long-term overgrazing, is evident throughout certain areas. **It is therefore recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers, in order to prevent continued overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.**

As stated earlier under heading 8.2, the applicant however intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. **It is therefore recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.**

A significant increase in soil surface rockiness and associated shallower soils are evident all along the outer perimeters and cliffs of the mountaintop plateaus. Such areas are also mainly associated with increased slope gradients towards the cliffs. These areas possess different and locally distinct vegetation species composition and -structure, with higher succulent- and conservationally significant species diversity, relative to the majority grassy karroid shrubland landscape of the mountaintop plateaus. The presences of the provincially protected species *Euphorbia avasmontana* as well as the provincially specially protected species *Aloe dichotoma* are significantly more prominent throughout such areas, while habitat-specific succulent species such as the two provincially protected species *Cotyledon orbiculata* and *Euphorbia mauritanica*, are diagnostically confined to such areas. Numerous clusters of the provincially protected species *Ammocharis coranica* were furthermore found at the initial laydown area location of wind turbine number B22, which forms part of the outer perimeter and cliff of the mountaintop plateau.

Three (3) clusters of the provincially protected species *Euphorbia avasmontana* were found to be present along the proposed access/service road portions towards wind turbine numbers B02 & D05. Four (4) clusters of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B03, B07, B09 & D01, respectively. This equates to a total of seven (7) *Euphorbia avasmontana* clusters, which are associated with the proposed wind power development footprint areas.

Three (3) individuals of the provincially specially protected species *Aloe dichotoma* were found to be present along the proposed access/service road portions towards wind turbine numbers B02, B03 & B12. Single individuals of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B01, B09 & B22, respectively. This equates to a total of six (6) *Aloe dichotoma* individuals, which will have to be destroyed/removed for the proposed wind power development. **A Moratorium is however currently in place in the Northern Cape Province, that prohibits the destruction/removal of *Aloe dichotoma* individuals. It is therefore recommended that all of the identified six (6) *Aloe dichotoma* individuals must be left intact. The identified individuals associated with the wind turbine laydown areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 10 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and transmission line networks, must also be adequately diverted around the identified individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.**

Due to the increased soil surface rockiness and associated different vegetation species composition and -structure, these outer perimeters and cliffs of the mountaintop plateaus also possess locally distinct and important faunal habitat attributes/features. It is therefore reasonably expected that such areas are likely utilised by various common and habitat-specific faunal (reptilian and mammalian) species as refuge and for breeding, foraging and persistence purposes.

As a result of the locally distinct vegetation species composition and -structure along with the associated locally distinct and important faunal habitat attributes/features, the outer perimeters and cliffs of the mountaintop plateaus are viewed as being of local ecological/conservational significance/value. It is therefore recommended that the outer perimeters and cliffs of the mountaintop plateaus be adequately buffered out of the proposed development footprint areas. No current or future development is allowed to take place within such buffered zones. Based on this recommendation along with the specific presences of clusters and individuals of the provincially protected species *Euphorbia avasmontana*, *Cotyledon orbiculata*, *Euphorbia mauritanica* and *Ammocharis coranica* as well as the provincially specially protected species *Aloe dichotoma*, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these ecologically/conservationally significant/sensitive areas and -species individuals:

- B01, B03, B07, B09, B15 & B22
- D01
- F03

See photographs on the next page.



Figure 8: Three images illustrating examples of the outer perimeters and cliffs of the mountaintop plateaus; the increased soil surface rockiness and slope gradient as well as the increased presence of the provincially protected species *Euphorbia avasmontana* and the provincially specially protected species *Aloe dichotoma*, are also evident

The karroid shrub species *Eriocephalus ericoides*, *Rhigozum trichotomum*, *Osteospermum sp.*, *Euryops oligoglossus* and *Pentzia spp.* were all found to be well-represented throughout the grassy karroid shrubland landscape of the mountaintop plateaus. The karroid shrub species *Zygophyllum sp.*, *Salsola aphylla*, *Chrysocoma spp.*, *Pteronia mucronata*, *P. glauca*, *Hertia pallens*, *Peliostomum leucorrhizum*, *Felicia spp.*, *Selago subspinosa*, *Aptosimum spinescens* and *A. procumbens* were also found to be present, but to a lesser extent. The karroid shrub species *Cadaba aphylla*, *Phaeoptilum spinosum*, *Asparagus spp.* and *Thesium hystrix* were merely found to be sparsely present throughout the mountaintop plateaus.

The grassy karroid shrubland landscape of the mountaintop plateaus also possesses a well-developed low-growing open woody shrub layer. The woody shrub species *Searsia burchellii*, *S. ciliata*, *Diospyros lycioides* and *Senegalia mellifera* were all found to be well-presented. A significant increase in presence/representation of the latter species is evident within- and along the edges of the identified single significant watercourse, which will be traversed by the proposed wind turbine access/service road network and the transmission line network with its access/service road (see discussion under heading 8.1). The woody shrub species *Rhigozum obovatum* was also found to be present throughout the mountaintop plateaus, but to a significantly lesser extent.

A single small isolated area, which is sparsely infested with the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province), was found to be present at the proposed laydown area of wind turbine number B10. This small area is utilised as a livestock feeding point, which is evident from the presence of feeding troughs and a water source. The continued concentrated disturbance associated with the livestock feeding processes, has over time led to the localised degradation of this small area and the subsequent establishment of alien invasive species. No other significant alien invasive species establishments were however found to be present throughout the mountaintop plateaus. **It is recommended that all individuals of the identified alien invasive species *Prosopis glandulosa*, must be actively eradicated from this identified area, in accordance with the requirements of the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. Removed materials must also be adequately and lawfully disposed of, in order to prevent potential further spreading/dispersal.**

The grassy karroid shrubland landscape of the mountaintop plateaus, are also sparsely covered by individuals of the nationally protected tree species *Boscia albitrunca*. The average density of this species throughout the mountaintop plateaus, was calculated to be approximately 4 individuals/ha. A minimum counted estimate of approximately 110 individuals were found to be present throughout the approximately 33.64 ha associated with the proposed wind turbine laydown areas and electrical combiner footprint areas as well as throughout the access/service road networks. These individuals will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height). Merely six (6) individuals of ≥ 2 m in height and a further nine (9) significantly sized individuals (≥ 3 m in height) were found to be present within close proximity to the proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

A Protected Tree License has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any nationally protected tree species individuals. It is however recommended that all of the identified six (6) *Boscia albitrunca* individuals of ≥ 2 m in height and the identified nine (9) significantly sized *Boscia albitrunca* individuals (≥ 3 m in height), must be left intact. The identified individuals associated with the wind turbine laydown areas and electrical combiner footprint areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 15 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and transmission line networks, must also be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity. Based on this recommendation, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these locally significant nationally protected tree individuals:

- B21, B23
- Northern electrical combiner

It is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed removal/destruction of nationally protected tree species individuals.

A diverse forb or succulent layer was not evident throughout the grassy karroid shrubland landscape of the mountaintop plateaus, during the site assessment. This was likely as a result of the less favourable timing of the site assessment. The forb/succulent species *Barleria rigida*, *B macrostegia*, *Blepharis mitrata*, *Crabbea hirsuta*, *Acanthopsis disperma*, *Dicoma capensis*, *Kleinia longiflora*, *Hermannia spinosa*, *Atriplex sp.* and *Geigeria ornativa* were all found to be well-represented.

The forb/succulent species *Sesamum triphyllum*, *Tribulus cristatus*, *Solanum capense*, *Ptychobium biflorum*, *Monsonia angustifolia* as well as the provincially protected species *Jamesbrittenia incisa*, *Ruschia spinosa* and *R hamata* were merely found to be sparsely present, while a single cluster of the provincially protected species *Aloe claviflora* was found to be present along the proposed access/service road portion towards wind turbine number B10. **A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified provincially protected species individuals. It is however recommended that the single cluster of the identified provincially protected species *Aloe claviflora*, must be adequately relocated to another suitable and similar area as to where it was removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced ecologist.**

Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were also found to be present in close proximity to the initially proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network. **Due to the subsequent relocation of certain wind turbines and their laydown areas as discussed earlier above, it is however not anticipated that these individuals will be directly affected by the proposed development. It is therefore recommended that they must be left intact. The proposed access/service road portion towards wind turbine number D05, must also be adequately diverted around the single identified individual, which was found to be present there.**

The grassy karroid shrubland landscape of the mountaintop plateaus houses a well-developed low-growing grass layer, which mainly consists of the species *Eragrostis lehmanniana*, *Aristida spp.*, *Stipagrostis spp.*, *Enneapogon desvauxii* and *E cenchroides*. The grass species *Heteropogon contortus*, *Melinis repens*, *Cenchrus ciliaris*, *Enneapogon scaber*, *Kyphocarpa angustifolia*, *Eragrostis echinochloidea* and *Trachus sp.* were also found to be present, but to a lesser extent. The grass species *Digitaria sp.* was merely found to be sparsely present throughout the mountaintop plateaus.

Apart from the species discussed above, no Red Data Listed-, other nationally protected- or other provincially protected plant species or any other plant species of conservational significance/value, were found to be present throughout the proposed wind turbine laydown areas and electrical combiner footprint areas or along the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network, all associated with the mountaintop plateaus.

See photographs on the next page.



Figure 9: Three images illustrating examples of the flat to slightly undulating grassy karroid shrubland landscape, associated with the three mountaintop plateaus; the well-developed low-growing open woody shrub layer, is also evident

8.2.2. Fauna and Avifauna

This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed wind power development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development area.

No conservationally significant or important faunal species or locally distinct faunal habitats were observed at any of the final proposed wind turbine laydown areas or along the proposed 33 kV electrical transmission line network and its associated access/service road network routes, throughout the mountaintop plateaus. Due to the undeveloped relatively natural state of the mountaintop plateaus, it is however reasonably expected that the local and broader area will likely be utilised by various common reptilian-, small antelope- as well as meso-predatory- and other mammalian species as refuge and for breeding, foraging and persistence purposes.

The combined total size of the wind turbine laydown- and combiner footprint areas is however minute relative to the surface areas of the mountaintop plateaus. The small laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. The mobility of faunal species along with the vast, continuous undeveloped surrounding natural landscape, allows for faunal individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

8.2.3. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

Present Ecological State (PES)

The Present Ecological State (PES) of the three mountaintop plateaus is classified as Class B as they are largely natural. A small change in natural habitats and biota has taken place, mainly as a result of slight historic and continued long-term overgrazing throughout certain areas. The ecosystem functionality has however remained essentially unchanged.

Ecological Importance and Sensitivity (EIS)

The Ecological Importance and Sensitivity (EIS) of the three mountaintop plateaus is classified as Class C (moderate) as they are viewed as being ecologically important and sensitive on local or possibly provincial scale. The areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP). The areas also house a moderate presence of the nationally protected tree species *Boscia albitrunca* as well as various provincially protected and specially protected plant species. Biodiversity is however still relatively ubiquitous and not usually sensitive to habitat modifications.

The three mountaintop plateaus are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The local and broader region surrounding the assessment areas however constitutes a vast, continuous undeveloped natural landscape. The combined total size of the laydown- and combiner footprint areas is therefore minute relative to the surface areas of the three mountaintop plateaus. The small laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. It is consequently not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial conservation- and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

It is therefore the opinion of the specialist that the proposed development of the assessment areas throughout the three mountaintop plateaus, should be considered by the competent authority, for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

8.3. Flat Bottomland Areas and Transitional Zone Surrounding the Mountain Range

The proposed development throughout the flat bottomland areas surrounding the mountain range, will constitute the construction of a main site access/service road, the short most northerly portion of the 132 kV electrical transmission line and its associated access/service road, a temporary equipment and construction materials laydown area (approximately ≤ 1 ha in size) as well as a security gate and subsequent security corridor (approximately 0.6 ha in combined total size).

The remaining majority of the 132 kV electrical transmission line and its associated access/service road, will however traverse a significantly undulating transitional zone between the mountaintop plateaus and the flat bottomland areas surrounding the mountain range.

The mechanical clearance associated with the proposed security gate and -corridor construction, will in all probability completely transform the majority of the existing surface vegetation throughout the two footprint areas. The combined total size of these security footprint areas is however negligible relative to the vast, continuous undeveloped natural landscape surrounding them. It is therefore not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

Virtually the entirety of the proposed main site access/service road constitutes existing farm tracks, while certain new road portions will also be constructed. A narrow linear physical footprint section of approximately 7 m in width (shoulders included), will be cleared of vegetation for the entire proposed access/service road. It will also be maintained as such, over time.

The transmission line servitude will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. It will also be maintained as such, over time. Significant portions of the proposed transmission line access/service road constitute existing farm tracks, while certain new road portions will also be constructed. A narrow linear farm track of approximately 4 m in width, will be cleared of vegetation underneath and all along the proposed transmission line, for the entire proposed access/service road. It will also be maintained as such, over time.

Vegetation clearance must be restricted to the narrow linear sections of the proposed main site access/service road route as well as the proposed 132 kV transmission line access/service road route, as far as practicably possible.

8.3.1. Current Existing Vegetation and Site Description

The proposed temporary equipment and construction materials laydown area, security gate and subsequent security corridor, the entire proposed main site access/service road, which traverses the flat bottomland areas to the south of the mountain range as well as the short most northerly portion of the proposed 132 kV electrical transmission line and its associated access/service road which traverses the flat bottomland areas to the north of the mountain range, form part of an extensive intertwined mosaic of mainly karroid shrubland landscape and to a lesser extent, karroid shrubby grassland landscape.

A slight difference in soil surface rockiness and associated soil depth appears to be the main determining/distinguishing factor between the two closely related vegetation variations. The majority karroid shrubland landscapes are mainly associated with slightly higher soil surface rockiness and effectively shallower soils, while the minority karroid shrubby grassland landscapes are associated with slightly lower soil surface rockiness and effectively slightly deeper soils, relative to each other. The vegetation species composition is however similar between the two vegetation variations, while merely slight differences in vegetation structure and -species representation are evident.

The flat bottomland areas are mainly utilised by commercial farmers as well as local informal subsistence farmers/land users for livestock grazing purposes. The ecology of the landscape is in a predominantly natural and functional state, although slight disturbance as a result of historic and continued long-term overgrazing, is evident throughout the majority of the areas. **It is therefore recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.**

An existing ESKOM electrical transmission line and associated access/service road is present, directly adjacent west of the majority of the proposed 132 kV transmission line route. Continual anthropogenic management and activities are subsequently associated with the existing transmission line. Such continued anthropogenic activities tend to cause an ecological 'edge effect', which negatively impacts on the transformed/natural interface area and subsequently on the ecological integrity of the localised surrounding undeveloped areas, by expanding the negative anthropogenic footprint. This has therefore resulted in a slight disturbance and negative impact on the ecological integrity and -functionality of the localised undeveloped areas surrounding the existing transmission line over time, which are associated with the proposed 132 kV transmission line route.

The karroid shrubland landscape of the flat bottomland areas is mainly dominated by the karroid shrub species *Rhigozum trichotomum* and *Pteronia mucronata*, while the species *Hertia pallens*, *Pentzia spp.*, *Felicia spp.*, *Aptosimum spinescens*, *A procumbens*, *Monechma incanum* and *Pteronia glauca* were also found to be well-represented. A slight increase in presence/representation of the latter two species is evident throughout the karroid shrubby grassland landscape of the flat bottomland areas.

The karroid shrub species *Osteospermum sp.*, *Eriocephalus ericoides*, *Euryops spp.*, *Salsola aphylla*, *Monsonia crassicaulis*, *Cadaba aphylla*, *Phaeoptilum spinosum*, *Lycium sp.*, *Asparagus spp.*, *Chrysocoma spp.*, *Peliostomum leucorrhizum* and *Thesium hystrix* were merely found to be sparsely present throughout the flat bottomland areas.

The karroid shrubland landscape of the flat bottomland areas also possesses a well-developed open to moderate-density woody shrub layer, which is however less conspicuous throughout the karroid shrubby grassland landscape. This woody shrub layer is overwhelmingly dominated by low-growing to medium-height shrubs of the woody species *Senegalia mellifera*, while individuals of the woody shrub species *Searsia burchellii* and *Rhigozum obovatum* were merely found to be very sparsely present throughout the karroid shrubland landscape of the flat bottomland areas. A slight increase in presence/representation of the latter two species is however evident within- and along the edges of the identified watercourses and water drainage lines/preferential flow paths, which will be traversed by the proposed main site access/service road and the transmission line with its access/service road (see discussion under heading 8.1). The presence/representation of the latter species is also moderately increased throughout the karroid shrubby grassland landscape of the flat bottomland areas, while the density of the first species is noticeably decreased; hence the less conspicuous woody shrub layer.

Two small isolated areas, which are sparsely infested with the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province), were found to be present along the most westerly commencement portion of the proposed main site access/service road. A third similarly infested area is also present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. **It is recommended that all individuals of the identified alien invasive species *Prosopis glandulosa*, must be actively eradicated from these identified three areas, in accordance with the requirements of the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. Removed materials must also be adequately and lawfully disposed of, in order to prevent potential further spreading/dispersal.**

The karroid shrubland- and karroid shrubby grassland landscapes of the flat bottomland areas, are also extensively covered by individuals of the nationally protected tree species *Boscia albitrunca*. The significantly undulating transitional zone associated with the majority of the proposed transmission line and its associated access/service road, is also sparsely covered by this species. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included) and 4 m in width, will respectively be cleared of vegetation for the entire proposed main site access/service road and the access/service road associated with the transmission line. They will also be maintained as such, over time.

Minimum counted estimates of approximately 160 and 100 individuals were respectively found to be present along the proposed main site access/service road- as well as the proposed transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range. This equates to a total of approximately 260 *Boscia albitrunca* individuals, which will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height), while merely fifteen (15) individuals of ≥ 2 m in height and a further ten (10) significantly sized individuals (≥ 3 m in height) were found to be present along the proposed main site access/service road route. A further nine (9) individuals of ≥ 2 m in height and a single (1) significantly sized individual (≥ 3 m in height) were also found to be present along the proposed transmission line and its associated access/service road route.

The transmission line servitude will not be holistically cleared of vegetation. Only the pylon locations will be cleared, while woody tree and shrub individuals of ≥ 2.5 m in height will be cut or removed, if found to be present directly underneath the transmission line or within a 3 m radius of a pylon location. It will also be maintained as such, over time. This clearance will therefore merely include the single (1) significantly sized (≥ 3 m in height) *Boscia albitrunca* individual, which was found to be present along the proposed transmission line and its associated access/service road route.

A Protected Tree License has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any nationally protected tree species individuals. It is however recommended that all of the identified twenty-four (24) *Boscia albitrunca* individuals of ≥ 2 m in height and the identified eleven (11) significantly sized *Boscia albitrunca* individuals (≥ 3 m in height), must be left intact. The proposed main site access/service road and the access/service road associated with the proposed transmission line, must therefore be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.

It is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed removal/destruction of nationally protected tree species individuals.

Merely a single (1) cluster of the provincially protected species *Euphorbia avasmontana* was found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. **The access/service road associated with the proposed transmission line, must therefore be adequately diverted around the identified locally significant cluster. This must be done in order to attempt to ensure its continued subsistence and longevity.**

Two (2) individuals of the provincially specially protected species *Aloe dichotoma* were also found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. **A Moratorium is however currently in place in the Northern Cape Province, that prohibits the destruction/removal of *Aloe dichotoma* individuals. It is therefore recommended that the identified two (2) *Aloe dichotoma* individuals must be left intact. The access/service road associated with the proposed transmission line, must therefore be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.**

A diverse forb or succulent layer was not evident throughout the karroid shrubland- or karroid shrubby grassland landscapes of the flat bottomland areas, during the site assessment. This was likely as a result of the less favourable timing of the site assessment. The forb species *Barleria rigida*, *B macrostegia*, *Blepharis mitrata*, *Acanthopsis disperma*, *Dicoma capensis*, *Kleinia longiflora*, *Geigeria ornativa* as well as the provincially protected species *Euphorbia mauritanica* were found to be well-represented throughout the flat bottomland areas, while the species *Sesamum triphyllum*, *Tribulus cristatus*, *Cyphocarpa angustifolia*, *Solanum capense* as well as the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* were merely found to be sparsely present. Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were found to be present along the proposed main site access/service road route. A further seven (7) individuals of this species were also found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. This equates to a total of ten (10) *Hoodia gordonii* individuals.

A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified provincially protected species individuals. It is however recommended that representative numbers of individuals/clusters of the identified provincially protected species *Aloe claviflora* and *Euphorbia braunsii* as well as all ten (10) identified individuals of the provincially specially protected species *Hoodia gordonii* must be adequately relocated to another suitable and similar area as to where they were removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced ecologist.

The karroid shrubland landscape of the flat bottomland areas houses a sparse low-growing grass layer, which mainly consists of the species *Aristida spp.*, *Stipagrostis spp.*, *Eragrostis lehmanniana*, *Enneapogon desvauxii*, *E cenchroides* and to a lesser extent, *Heteropogon contortus*. The grass layer of the karroid shrubby grassland landscape is however visibly more prominent and significantly better-represented. The presence/representation of the latter species is also moderately increased throughout the karroid shrubby grassland landscape.

Apart from the species discussed above, no Red Data Listed-, other nationally protected- or other provincially protected plant species or any other plant species of conservational significance/value, were found to be present along the proposed main site access/service road- and the proposed transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range.

See photographs on the next page.



Figure 10: Image illustrating an example of the majority karroid shrubland landscape associated with the flat bottomland areas to the south of the mountain range; the existing farm tracks associated with the proposed main site assess/service road route, are also evident



Figure 11: Image illustrating an example of the minority karroid shrubby grassland landscape of the proposed main site assess/service road route, associated with the flat bottomland areas to the south of the mountain range



Figure 12: Image illustrating an example of the short most northerly portion of the proposed 132 kV electrical transmission line and its associated access/service road, which will traverse the flat bottomland areas to the north of the mountain range; the existing Eskom electrical transmission line and associated access/service road which is present directly adjacent west of the proposed transmission line route, are also evident



Figure 13: Image illustrating an example of the significantly undulating transitional zone between the mountaintop plateaus and the flat bottomland areas surrounding the mountain range, which will be traversed by the proposed 132 kV electrical transmission line and its associated access/service road; the existing Eskom electrical transmission line and associated access/service road which is present directly adjacent west of the proposed transmission line route, are also evident

8.3.2. Fauna and Avifauna

This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed wind power development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development area.

No conservationally significant or important faunal species or locally distinct faunal habitats were observed along the proposed main site access/service road- and the proposed 132 kV transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range. Due to the undeveloped relatively natural state of the flat bottomland areas and transitional zone, it is however reasonably expected that the local and broader area will likely be utilised by various common reptilian-, small antelope- as well as meso-predatory- and other mammalian species as refuge and for breeding, foraging and persistence purposes.

The combined total size of the proposed development footprint areas is however negligible relative to the surface areas of the flat bottomland areas and transitional zone surrounding the mountain range. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The mobility of faunal species along with the vast, continuous undeveloped surrounding natural landscape, allows for faunal individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

8.3.3. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

Present Ecological State (PES)

The Present Ecological State (PES) of the flat bottomland areas and transitional zone surrounding the mountain range, is classified as Class B as they are largely natural. A small change in natural habitats and biota has taken place, mainly as a result of slight historic and continued long-term overgrazing throughout the majority of the areas. The ecosystem functionality has however remained essentially unchanged.

Ecological Importance and Sensitivity (EIS)

The Ecological Importance and Sensitivity (EIS) of the flat bottomland areas and transitional zone surrounding the mountain range, is classified as Class C (moderate) as they are viewed as being ecologically important and sensitive on local or possibly provincial scale. The areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP). The areas also house a moderate presence of the nationally protected tree species *Boscia albitrunca* as well as various provincially protected and specially protected plant species. Biodiversity is however still relatively ubiquitous and not usually sensitive to habitat modifications.

The proposed main site access/service road and the 132 kV electrical transmission line with its associated access/service road, will also traverse numerous significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths at approximately sixty-one (61) locations, throughout the flat bottomland areas and transitional zone. These watercourses and drainage lines/flow paths are responsible for a significant portion of the local catchment and drainage, associated with surface water runoff throughout the flat bottomland areas surrounding the mountain range. The significant watercourses therefore form an important part of the local and broader quaternary surface water catchment- and drainage area. It is however not anticipated that the proposed development at these significant watercourse- and flow path/drainage line crossings, should significantly impede or impact on their flow regimes.

The flat bottomland areas and transitional zone surrounding the mountain range, are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The local and broader region surrounding the assessment areas however constitutes a vast, continuous undeveloped natural landscape. The combined total size of the proposed development footprint areas is however negligible relative to the surface areas of the flat bottomland areas and transitional zone surrounding the mountain range. It is consequently not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial conservation- and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

It is therefore the opinion of the specialist that the proposed development of the assessment areas throughout the flat bottomland areas and transitional zone surrounding the mountain range, should be considered by the competent authority, for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

8.4. Ecological Site Sensitivity Map

The site sensitivity map below (see A3 sized map in the Appendices) illustrates the locations of all the significantly sized individuals of the nationally protected tree species *Boscia albitrunca*, the various provincially protected and specially protected plant species individuals/clusters as well as the approximately sixty-seven (67) watercourse- and water drainage line/preferential flow path crossings, associated with the proposed development.

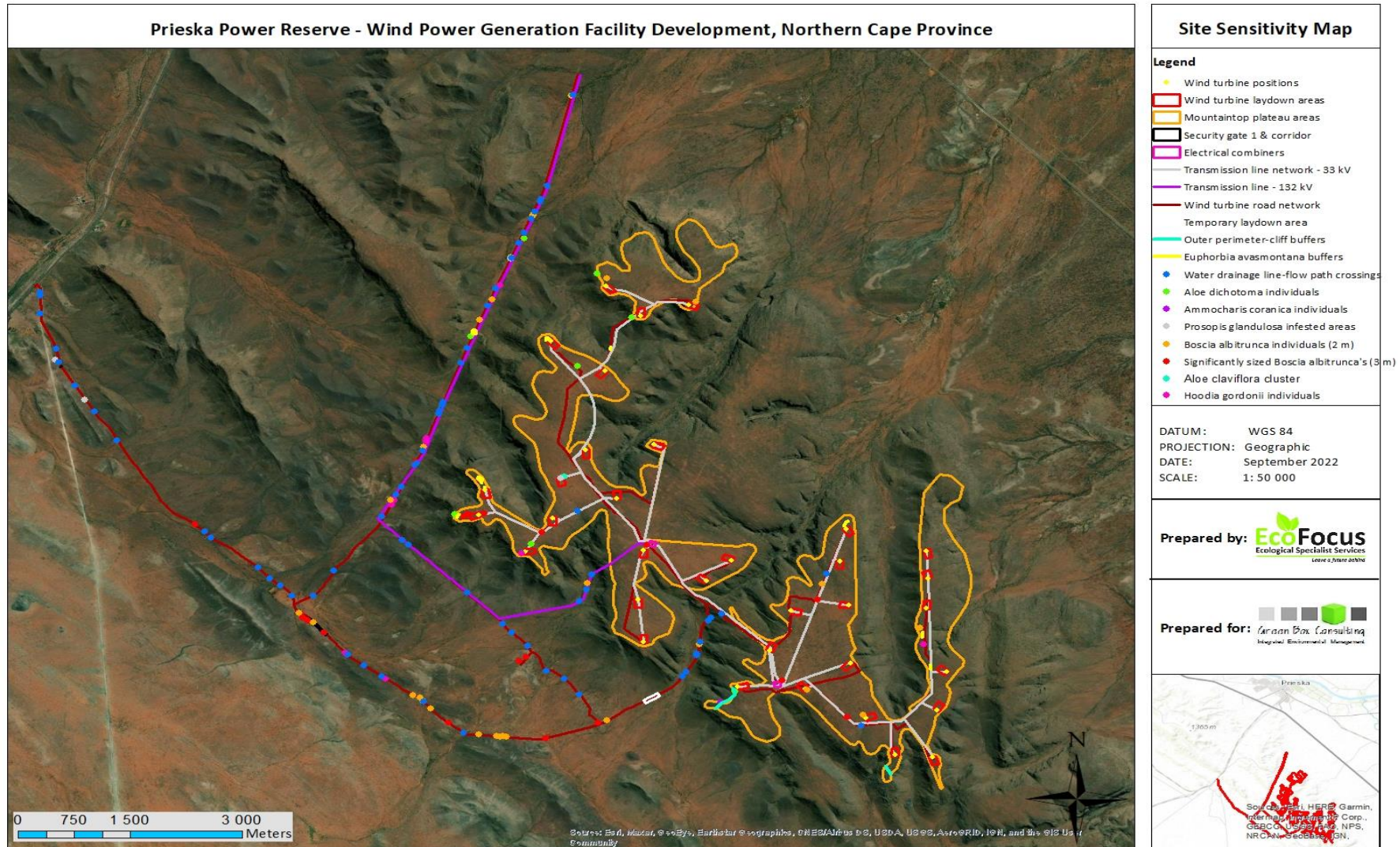


Figure 14: Site sensitivity map illustrating the locations of all the significantly sized individuals of the nationally protected tree species *Boscia albitrunca*, the various provincially protected and specially protected plant species individuals/clusters as well as the approximately sixty-seven (67) watercourse- and water drainage line/preferential flow path crossings, associated with the proposed development

8.5. Plant Species List for the Assessment Areas

Table 5: Plant species list for the three mountaintop plateau assessment areas (Nationally protected species highlighted in orange; Provincially protected species highlighted in yellow; Legally declared alien invasive species highlighted in pink)

Graminoids	Forbs & Succulents	Karroid & Woody Shrubs/Trees
<i>Aristida spp.</i>	<i>Acanthopsis disperma</i>	<i>Aloe dichotoma</i>
<i>Cenchrus ciliaris</i>	<i>Aloe claviflora</i>	<i>Aptosimum procumbens</i>
<i>Digitaria sp.</i>	<i>Ammocharis coranica</i>	<i>Aptosimum spinescens</i>
<i>Enneapogon cenchroides</i>	<i>Atriplex sp.</i>	<i>Asparagus spp.</i>
<i>Enneapogon desvauxii</i>	<i>Barleria macrostegia</i>	<i>Boscia albitrunca</i>
<i>Enneapogon scaber</i>	<i>Barleria rigida</i>	<i>Cadaba aphylla</i>
<i>Eragrostis echinocloidea</i>	<i>Blepharis mitrata</i>	<i>Chrysocoma spp.</i>
<i>Eragrostis lehmanniana</i>	<i>Cotyledon orbiculata</i>	<i>Diospyros lycioides</i>
<i>Heteropogon contortus</i>	<i>Crabbea hirsuta</i>	<i>Eriocephalus ericoides</i>
<i>Kyphocarpa angustifolia</i>	<i>Dicoma capensis</i>	<i>Euphorbia avasmontana</i>
<i>Melinis repens</i>	<i>Euphorbia mauritanica</i>	<i>Euryops oligoglossus</i>
<i>Stipagrostis spp.</i>	<i>Geigeria ornativa</i>	<i>Felicia spp.</i>
<i>Trachus sp.</i>	<i>Hermannia spinosa</i>	<i>Hertia pallens</i>
-	<i>Hoodia gordonii</i>	<i>Osteospermum sp.</i>
-	<i>Jamesbrittenia incisa</i>	<i>Peliostomum leucorrhizum</i>
-	<i>Kleinia longiflora</i>	<i>Pentzia spp.</i>
-	<i>Monsonia angustifolia</i>	<i>Phaeoptilum spinosum</i>
-	<i>Ptycholobium biflorum</i>	<i>Prosopis glandulosa</i>
-	<i>Ruschia hamata</i>	<i>Pteronia glauca</i>
-	<i>Ruschia spinosa</i>	<i>Pteronia mucronata</i>
-	<i>Sesamum triphyllum</i>	<i>Rhigozum obovatum</i>
-	<i>Solanum capense</i>	<i>Rhigozum trichotomum</i>
-	<i>Tribulus cristatus</i>	<i>Salsola aphylla</i>
-	-	<i>Searsia burchellii</i>
-	-	<i>Searsia ciliata</i>
-	-	<i>Selago subspinoso</i>
-	-	<i>Senegalia mellifera</i>
-	-	<i>Thesium hystrix</i>
-	-	<i>Zygophyllum sp.</i>

Table 6: Plant species list for the flat bottomland areas and transitional zone surrounding the mountain range (Nationally protected species highlighted in orange; Provincially protected species highlighted in yellow; Legally declared alien invasive species highlighted in pink)

Graminoids	Forbs & Succulents	Karroid & Woody Shrubs/Trees
<i>Aristida spp.</i>	<i>Acanthopsis disperma</i>	<i>Aloe dichotoma</i>
<i>Enneapogon cenchroides</i>	<i>Aloe claviflora</i>	<i>Aptosimum procumbens</i>
<i>Enneapogon desvauxii</i>	<i>Barleria macrostegia</i>	<i>Aptosimum spinescens</i>
<i>Eragrostis lehmanniana</i>	<i>Barleria rigida</i>	<i>Asparagus spp.</i>
<i>Heteropogon contortus</i>	<i>Blepharis mitrata</i>	<i>Boscia albitrunca</i>
<i>Stipagrostis spp.</i>	<i>Cyphocarpa angustifolia</i>	<i>Cadaba aphylla</i>
-	<i>Dicoma capensis</i>	<i>Chrysocoma spp.</i>
-	<i>Euphorbia braunsii</i>	<i>Eriocephalus ericoides</i>
-	<i>Euphorbia mauritanica</i>	<i>Euphorbia avasmontana</i>
-	<i>Geigeria ornativa</i>	<i>Euryops spp.</i>
-	<i>Hoodia gordonii</i>	<i>Felicia spp.</i>
-	<i>Kleinia longiflora</i>	<i>Hertia pallens</i>
-	<i>Sesamum triphyllum</i>	<i>Lycium sp.</i>
-	<i>Solanum capense</i>	<i>Monechma incanum</i>
-	<i>Tribulus cristatus</i>	<i>Monsonia crassicaulis</i>
-	-	<i>Osteospermum sp.</i>
-	-	<i>Peliostomum leucorrhizum</i>
-	-	<i>Pentzia spp.</i>
-	-	<i>Phaeoptilum spinosum</i>
-	-	<i>Prosopis glandulosa</i>
-	-	<i>Pteronia glauca</i>
-	-	<i>Pteronia mucronata</i>
-	-	<i>Rhigozum obovatum</i>
-	-	<i>Rhigozum trichotomum</i>
-	-	<i>Salsola aphylla</i>
-	-	<i>Searsia burchellii</i>
-	-	<i>Senegalia mellifera</i>
-	-	<i>Thesium hystrix</i>

9. Ecological Impact Assessment

The following section identifies the potential ecological impacts (both positive and negative), which the proposed development will have on the surrounding environment.

Once the potential ecological impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified ecological impact.

The same Environmental Risk rating process is then followed for each ecological impact to determine the Environmental Significance, if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the potential ecological impacts associated with the proposed development and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The potential ecological impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implementation of effective management strategies for them.

9.1. Construction Phase

Transformation of vegetation within the assessment areas associated with the Lower Gariep Broken Veld (NKb 1) and Bushmanland Arid Grassland (NKb 3) vegetation types

According to SANBI (2006-2019), the three mountaintop plateau assessment areas form part of the Lower Gariep Broken Veld vegetation type (NKb 1). The flat bottomland assessment areas surrounding the mountain range, however fall within the Bushmanland Arid Grassland vegetation type (NKb 3). Both of these vegetation types are classified as Least Concerned (SANBI, 2006-2019).

The three mountaintop plateaus all constitute relatively homogenous, flat to slightly undulating grassy karroid shrubland landscapes. Merely slight variations in vegetation species composition and representation are evident throughout certain areas. These variations are however deemed negligible in the ecological context of the landscape.

A significant increase in soil surface rockiness and associated shallower soils are evident all along the outer perimeters and cliffs of the mountaintop plateaus. Such areas are also mainly associated with increased slope gradients towards the cliffs. These areas possess different and locally distinct vegetation species composition and -structure, with higher succulent- and conservationally significant species diversity, relative to the majority grassy karroid shrubland landscape of the mountaintop plateaus.

The flat bottomland areas form part of an extensive intertwined mosaic of mainly karroid shrubland landscape and to a lesser extent, karroid shrubby grassland landscape. The majority of the 132 kV electrical transmission line and its associated access/service road, will however traverse a significantly undulating transitional zone between the mountaintop plateaus and the flat bottomland areas surrounding the mountain range.

The mountaintop plateaus and the flat bottomland areas are mainly utilised by commercial farmers as well as local informal subsistence farmers/land users for livestock grazing purposes. The ecology of the landscape is in a predominantly natural and functional state, although slight disturbance as a result of historic and continued long-term overgrazing, is evident throughout certain areas of the mountaintop plateaus and the majority of the flat bottomland areas.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

The significance of this potential impact will be low.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Transformation of an Ecological Support Area (ESA) associated with the assessment areas

The entirety of the three mountaintop plateau- and the flat bottomland assessment areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province.

The mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range, both scored moderate Ecological Importance and Sensitivity (EIS) values and are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

The significance of this potential impact will be low.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Destruction of-/damage to Red Data Listed, nationally- or provincially protected species individuals/habitats associated with the assessment areas

A significant increase in soil surface rockiness and associated shallower soils are evident all along the outer perimeters and cliffs of the mountaintop plateaus. Such areas are also mainly associated with increased slope gradients towards the cliffs. These areas possess different and locally distinct vegetation species composition and -structure, with higher succulent- and conservationally significant species diversity, relative to the majority grassy karroid shrubland landscape of the mountaintop plateaus. The presences of the provincially protected species *Euphorbia avasmontana* as well as the provincially specially protected species *Aloe dichotoma* are significantly more prominent throughout such areas, while habitat-specific succulent species such as the two provincially protected species *Cotyledon orbiculata* and *Euphorbia mauritanica*, are diagnostically confined to such areas. Numerous clusters of the provincially protected species *Ammocharis coranica* were furthermore found at the initial laydown area location of wind turbine number B22, which forms part of the outer perimeter and cliff of the mountaintop plateau.

Due to the increased soil surface rockiness and associated different vegetation species composition and -structure, these outer perimeters and cliffs of the mountaintop plateaus also possess locally distinct and important faunal habitat attributes/features. It is therefore reasonably expected that such areas are likely utilised by various common and habitat-specific faunal (reptilian and mammalian) species as refuge and for breeding, foraging and persistence purposes.

Three (3) clusters of the provincially protected species *Euphorbia avasmontana* were found to be present along the proposed access/service road portions towards wind turbine numbers B02 & D05. Four (4) clusters of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B03, B07, B09 & D01, respectively. This equates to a total of seven (7) *Euphorbia avasmontana* clusters, which are associated with the proposed wind power development footprint areas.

Merely a single (1) cluster of the provincially protected species *Euphorbia avasmontana* was found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

Three (3) individuals of the provincially specially protected species *Aloe dichotoma* were found to be present along the proposed access/service road portions towards wind turbine numbers B02, B03 & B12. Single individuals of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B01, B09 & B22, respectively. This equates to a total of six (6) *Aloe dichotoma* individuals, which will have to be destroyed/removed for the proposed wind power development.

Two (2) individuals of the provincially specially protected species *Aloe dichotoma* were also found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

The grassy karroid shrubland landscape of the mountaintop plateaus, are also sparsely covered by individuals of the nationally protected tree species *Boscia albitrunca*. The average density of this species throughout the mountaintop plateaus, was calculated to be approximately 4 individuals/ha. A minimum counted estimate of approximately 110 individuals were found to be present throughout the approximately 33.64 ha associated with the proposed wind turbine laydown areas and electrical combiner footprint areas as well as throughout the access/service road networks. These individuals will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height). Merely six (6) individuals of ≥ 2 m in height and a further nine (9) significantly sized individuals (≥ 3 m in height) were found to be present within close proximity to the proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The karroid shrubland- and karroid shrubby grassland landscapes of the flat bottomland areas, are also extensively covered by individuals of the nationally protected tree species *Boscia albitrunca*. The significantly undulating transitional zone associated with the majority of the proposed transmission line and its associated access/service road, is also sparsely covered by this species. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included) and 4 m in width, will respectively be cleared of vegetation for the entire proposed main site access/service road and the access/service road associated with the transmission line. They will also be maintained as such, over time.

Minimum counted estimates of approximately 160 and 100 individuals were respectively found to be present along the proposed main site access/service road- as well as the proposed transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range. This equates to a total of approximately 260 *Boscia albitrunca* individuals, which will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height), while merely fifteen (15) individuals of ≥ 2 m in height and a further ten (10) significantly sized individuals (≥ 3 m in height) were found to be present along the proposed main site access/service road route. A further nine (9) individuals of ≥ 2 m in height and a single (1) significantly sized individual (≥ 3 m in height) were also found to be present along the proposed transmission line and its associated access/service road route.

The provincially protected species *Jamesbrittenia incisa*, *Ruschia spinosa* and *R hamata* were merely found to be sparsely present, while a single cluster of the provincially protected species *Aloe claviflora* was found to be present along the proposed access/service road portion towards wind turbine number B10.

Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were also found to be present in close proximity to the initially proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The provincially protected species *Euphorbia mauritanica* was found to be well-represented throughout the flat bottomland areas, while the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* were merely found to be sparsely present. Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were found to be present along the proposed main site access/service road route. A further seven (7) individuals of this species were also found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. This equates to a total of ten (10) *Hoodia gordonii* individuals.

Apart from the species discussed above, no Red Data Listed-, other nationally protected- or other provincially protected plant species or any other plant species of conservational significance/value, were found to be present throughout any of the proposed development areas, associated with the three mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed wind power development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development area.

No conservationally significant or important faunal species or locally distinct faunal habitats were observed throughout the mountaintop plateaus or the flat bottomland areas and transitional zone surrounding the mountain range. Due to the undeveloped relatively natural state of the mountaintop plateaus as well as the flat bottomland areas and transitional zone, it is however reasonably expected that the local and broader area will likely be utilised by various common reptilian-, small antelope- as well as meso-predatory- and other mammalian species as refuge and for breeding, foraging and persistence purposes. The mobility of faunal species along with the vast, continuous undeveloped surrounding natural landscape, allows for faunal individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

The significance of this potential impact will be medium-high for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range. Mitigation measures to reduce impacts are recommended under heading 9.4.

Terrestrial and aquatic alien invasive species establishment

A single small isolated area, which is sparsely infested with the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province), was found to be present at the proposed laydown area of wind turbine number B10. This small area is utilised as a livestock feeding point, which is evident from the presence of feeding troughs and a water source. The continued concentrated disturbance associated with the livestock feeding processes, has over time led to the localised degradation of this small area and the subsequent establishment of alien invasive species.

Two small isolated areas, which are sparsely infested with the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province), were found to be present along the most westerly commencement portion of the proposed main site access/service road. A third similarly infested area is also present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

No other significant alien invasive species establishments were found to be present throughout the assessment areas. The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The assessment areas could therefore potentially be prone to slight alien invasive species establishment, due to surface disturbance and vegetation clearance caused by construction activities. The presence of numerous watercourses and water drainage lines/preferential flow paths, throughout the flat bottomland areas and transitional zone surrounding the mountain range, which will be crossed by the proposed development, could further also potentially act as significant transport/distribution vectors for numerous terrestrial and aquatic alien invasive species into the broader region.

The significance of this potential impact will be low for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Surface material erosion

The three mountaintop plateaus all constitute relatively homogenous, flat to slightly undulating grassy karroid shrubland landscapes. The flat bottomland areas consist of mostly flat landscapes, while the transitional zone surrounding the mountain range constitutes a significantly undulating landscape.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The assessment areas and surrounding undeveloped landscape could therefore potentially be prone to slight- to moderate surface soil erosion, due to the loosening of materials and clearance of vegetation caused by construction activities, which usually binds surface material.

The significance of this potential impact will be low for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Dust generation and emissions

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The construction activities associated with the proposed development, could potentially result in slight fugitive dust emissions, due to vegetation clearance and movement of machinery and equipment. Generated dust could spread into the local and broader surrounding landscape and potentially contaminate the numerous watercourses and water drainage lines/preferential flow paths, throughout the flat bottomland areas and transitional zone surrounding the mountain range.

The significance of this potential impact will be low for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area

The proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, will merely traverse five (5) small ephemeral water drainage lines/preferential flow paths as well as a single significant first-order ephemeral watercourse, throughout the three mountaintop plateaus. These drainage lines/flow paths and single significant watercourse assist with channelling and discharging surface water runoff from small portions of the mountaintop plateaus, towards the surrounding flat bottomland areas. From a hydrological perspective, these drainage lines/flow paths and single significant watercourse therefore merely play a minor assisting role in the local catchment and drainage, associated with surface water runoff from the mountain range. These drainage lines/flow paths and single significant watercourse are therefore not viewed as being of high conservational significance/value, from a hydrological or ecological perspective. It is however not anticipated that the proposed development at these flow path/drainage line- and single significant watercourse crossings, should significantly impede or impact on their flow regimes.

The proposed main site access/service road and the 132 kV electrical transmission line with its associated access/service road, will traverse numerous significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths at approximately sixty-one (61) locations, throughout the flat bottomland areas and transitional zone. These watercourses and drainage lines/flow paths are responsible for a significant portion of the local catchment and drainage, associated with surface water runoff throughout the flat bottomland areas surrounding the mountain range. The significant watercourses therefore form an important part of the local and broader quaternary surface water catchment- and drainage area. It is however not anticipated that the proposed development at these significant watercourse- and flow path/drainage line crossings, should significantly impede or impact on their flow regimes

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The construction activities associated with the proposed development, could potentially result in slight- to significant impeding of natural surface water flow through the assessment areas towards the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, due to artificial obstruction of flow during rainfall events.

The construction phase could potentially also result in contamination of natural surface water flow through the assessment areas towards the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, due to hydrocarbon and/or other chemical spills by construction machinery and equipment.

The significance of this potential impact will be low for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

9.2. Operational Phase

Destruction of-/damage to Red Data Listed, nationally- and/or provincially protected species individuals/habitats associated with the assessment area, terrestrial and aquatic alien invasive species establishment throughout the flat bottomland areas and transitional zone surrounding the mountain range as well as impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as significant potential long-term ecological impact, associated with the construction phase of the proposed development.

Once the construction phase of the proposed development has been completed, the subsequent operational phase should not result in any significant additional potential ecological impacts, apart from the potential long-term ecological impacts, as discussed under heading 9.1.

A number of the already discussed potential ecological impacts could however change in nature (duration and severity) during the operational phase and could continue throughout the entire operational phase and lifespan of the proposed development. The following continued potential ecological impacts could take place during the operational phase:

Continued dust generation and emissions

The operational activities associated with the proposed development, could potentially result in slight continual fugitive dust emissions, due to the areas having been mechanically cleared and subsequently being devoid of surface vegetation cover. Continued movement of machinery and equipment will likely also increase the significance of fugitive dust emissions. Generated dust could continue to spread into the local and broader surrounding landscape and potentially contaminate the numerous watercourses and water drainage lines/preferential flow paths, throughout the flat bottomland areas and transitional zone surrounding the mountain range.

The significance of this potential impact will be low for the mountaintop plateaus and medium for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Continued impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area

The established wind power development could potentially continuously impede on the natural surface water flow through the assessment areas towards the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, due to continued artificial obstruction of flow during rainfall events.

The operations of the established wind power development could further potentially result in continued contamination of natural surface water flow within the associated local and broader quaternary surface water catchment- and drainage area, due to the areas having been mechanically cleared and subsequently being devoid of surface vegetation cover.

The significance of this potential impact will be low for the mountaintop plateaus and medium-high for the flat bottomland areas and transitional zone surrounding the mountain range.

Mitigation measures to reduce impacts are recommended under heading 9.4.

9.3. Cumulative Impacts

The mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range, both scored moderate Ecological Importance and Sensitivity (EIS) values and are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

Destruction of-/damage to Red Data Listed, nationally- and/or provincially protected species individuals/habitats associated with the assessment area, terrestrial and aquatic alien invasive species establishment throughout the flat bottomland areas and transitional zone surrounding the mountain range as well as impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as significant potential long-term ecological impact, associated with the construction phase of the proposed development.

Continued impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area was furthermore identified and addressed as a continued significant potential long-term ecological impact, associated with the operational phase of the proposed development.

Although the broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape, the proposed development merely forms a small part of the first phase of a significantly sized and extensive renewable energy power generating hub, which is envisaged for the broader area to the south of the town of Prieska, over time. Significant future development expansion and subsequent transformation in the same geographical area, which could likely lead to further cumulative ecological impacts, will therefore in all probability take place within the local and broader area, over time.

The significant potential long-term ecological impacts identified for the proposed development, could therefore potentially add moderate cumulative impact to the existing and anticipated future negative impacts, associated with the envisaged significantly sized and extensive renewable energy power generating hub, over time.

It is however the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential cumulative ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures. It is therefore not anticipated that the proposed development will add any significant residual cumulative ecological impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report are adequately implemented and managed, for both the construction- and operational phases of the proposed development.

It is the opinion of the specialist that the proposed development of the assessment areas should be considered by the competent authority, for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

9.4. Risk Ratings of Potential Ecological Impacts

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the potential ecological impacts associated with the proposed development, both before and after implementation of the recommended mitigation measures.

9.4.1. Construction Phase

Table 7: Environmental Risk and Significance Ratings

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Transformation of vegetation within the assessment areas associated with the Lower Gariep Broken Veld (NKb 1) and Bushmanland Arid Grassland (NKb 3) vegetation types	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	Low (4)	Low (4)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (48)	Low (42)

Mitigation Measures to be implemented

The proposed development construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the local or broader natural landscape surrounding the assessment areas, may take place.

Vegetation clearance must be restricted to the narrow linear sections of the proposed wind turbine access/service road routes as well as the proposed 33 kV transmission line network access/service road routes, as far as practicably possible.

Vegetation clearance must be restricted to the narrow linear sections of the proposed main site access/service road route as well as the proposed 132 kV transmission line access/service road route, as far as practicably possible.

No site construction basecamps may be established within the local or broader natural landscape surrounding the assessment areas.

Adequately cordon off the proposed development construction footprint area and ensure that no construction activities, -machinery or -equipment operate or impact within the local or broader surrounding natural landscape outside the cordoned off area.

Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint areas and to ensure environmentally responsible construction practices and activities.

	<p>Existing roads and farm tracks in close proximity to the proposed development construction footprint areas, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the local or broader natural landscape surrounding the assessment areas.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.</p> <p>It is also recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (45)	Low (26)

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Transformation of an Ecological Support Area (ESA) associated with the assessment areas	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	Low (4)	Low (4)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (48)	Low (42)

Mitigation Measures to be implemented

The proposed development construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the local or broader natural landscape surrounding the assessment areas, may take place.

Vegetation clearance must be restricted to the narrow linear sections of the proposed wind turbine access/service road routes as well as the proposed 33 kV transmission line network access/service road routes, as far as practicably possible.

Vegetation clearance must be restricted to the narrow linear sections of the proposed main site access/service road route as well as the proposed 132 kV transmission line access/service road route, as far as practicably possible.

No site construction basecamps may be established within the local or broader natural landscape surrounding the assessment areas.

Adequately cordon off the proposed development construction footprint area and ensure that no construction activities, -machinery or -equipment operate or impact within the local or broader surrounding natural landscape outside the cordoned off area.

Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint areas and to ensure environmentally responsible construction practices and activities.

	<p>Existing roads and farm tracks in close proximity to the proposed development construction footprint areas, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the local or broader natural landscape surrounding the assessment areas.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.</p> <p>It is also recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	<p>Low</p>	<p>Low</p>
Environmental Significance Score and Rating after mitigation implementation	<p>Low (26)</p>	<p>Low (13)</p>

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Destruction of-/damage to Red Data Listed, nationally- or provincially protected species individuals/habitats associated with the assessment areas	
Magnitude of Negative or Positive Impact	Medium (6)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Moderate (3)
Reversibility of Impact	Low (4)	Low (4)
Probability of Impact Occurrence	High (4)	High (4)
Cumulative Impact Rating prior to mitigation	Medium	Medium
Environmental Significance Score and Rating prior to mitigation	Medium-High (76)	Medium (68)

Mitigation Measures to be implemented

A Moratorium is currently in place in the Northern Cape Province, that prohibits the destruction/removal of *Aloe dichotoma* individuals. It is therefore recommended that all of the identified eight (8) *Aloe dichotoma* individuals must be left intact. The identified individuals associated with the wind turbine laydown areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 10 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.

It is recommended that the outer perimeters and cliffs of the mountaintop plateaus be adequately buffered out of the proposed development footprint areas. No current or future development is allowed to take place within such buffered zones. Based on this recommendation along with the specific presences of clusters and individuals of the provincially protected species *Euphorbia avasmontana*, *Cotyledon orbiculata*, *Euphorbia mauritanica* and *Ammocharis coranica* as well as the provincially specially protected species *Aloe dichotoma*, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these ecologically/conservationally significant/sensitive areas and -species individuals:

- B01, B03, B07, B09, B15 & B22
- D01
- F03

The access/service road associated with the proposed 132 kV transmission line, must be adequately diverted around the identified *Euphorbia avasmontana* cluster, associated with the flat bottomland areas and transitional zone surrounding the mountain range. This must be done in order to attempt to ensure its continued subsistence and longevity.

A Protected Tree License has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any nationally protected tree species individuals. It is however recommended that all of the identified thirty (30) *Boscia albitrunca* individuals of ≥ 2 m in height and the identified twenty-one (20) significantly sized *Boscia albitrunca* individuals (≥ 3 m in height), must be left intact. The identified individuals associated with the wind turbine laydown areas and electrical combiner footprint areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 15 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the main site access/service road and the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity. Based on this recommendation, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these locally significant nationally protected tree individuals:

- B21, B23
- Northern electrical combiner

It is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed removal/destruction of nationally protected tress species individuals.

A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified provincially protected species individuals. It is however recommended that the single cluster of the identified provincially protected species *Aloe claviflora*, must be adequately relocated to another suitable and similar area as to where it was removed from. It is also recommended that representative numbers of individuals/clusters of the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* as well as all ten (10) identified individuals of the provincially specially protected species *Hoodia gordonii* identified throughout the flat bottomland areas and transitional zone surrounding the mountain range, must be adequately relocated to another suitable and similar area as to where they were removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced ecologist.

Due to the subsequent relocation of certain wind turbines and their laydown areas as discussed earlier above, it is however not anticipated that the identified *Hoodia gordonii* individuals associated with the mountaintop plateaus, will be directly affected by the proposed development. It is therefore recommended that they must be left intact. The proposed access/service road portion towards wind turbine number D05, must also be adequately diverted around the single identified individual, which was found to be present there.

The proposed development construction footprints must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the local or broader natural landscape surrounding the assessment areas, may take place.

Vegetation clearance must be restricted to the narrow linear sections of the proposed wind turbine access/service road routes as well as the proposed 33 kV transmission line network access/service road routes, as far as practicably possible.

Vegetation clearance must be restricted to the narrow linear sections of the proposed main site access/service road route as well as the proposed 132 kV transmission line access/service road route, as far as practicably possible.

No site construction basecamps may be established within the local or broader natural landscape surrounding the assessment areas.

Adequately cordon off the proposed development construction footprint area and ensure that no construction activities, -machinery or -equipment operate or impact within the local or broader surrounding natural landscape outside the cordoned off area.

Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint areas and to ensure environmentally responsible construction practices and activities.

	<p>Existing roads and farm tracks in close proximity to the proposed development construction footprint areas, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the local or broader natural landscape surrounding the assessment areas.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.</p> <p>It is also recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (48)	Low (32)

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Terrestrial and aquatic alien invasive species establishment	
Magnitude of Negative or Positive Impact	Low (4)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Moderate (3)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (42)	Medium (64)

Mitigation Measures to be implemented

It is recommended that all individuals of the identified alien invasive species *Prosopis glandulosa*, must be actively eradicated from the identified areas, in accordance with the requirements of the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. Removed materials must also be adequately and lawfully disposed of, in order to prevent potential further spreading/dispersal.

Implement an adequate Alien Invasive Species Management and Prevention Plan during the construction and operational phases. Such a Management Plan must be compiled by a suitably qualified and experienced ecologist.

Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.

It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.

It is also recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.

	No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (11)	Low (24)
	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Surface material erosion	
Magnitude of Negative or Positive Impact	Low (4)	Low (4)
Duration of Negative or Positive Impact	Long term (4)	Long term (4)
Extent of Positive or Negative Impact	Local (2)	Local (2)

Irreplaceability of Natural Resources being impacted upon	Low (2)	Low (2)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (42)	Medium (60)
Mitigation Measures to be implemented	<p>Implement an adequate Stormwater and Erosion Management Plan during the construction and operational phases of the proposed development. This must be done to sufficiently manage storm water runoff and clean/dirty water separation, in order to prevent any significant soil erosion within and around the assessment areas.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (11)	Low (22)

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Dust generation and emissions	
Magnitude of Negative or Positive Impact	Low (4)	Low (4)
Duration of Negative or Positive Impact	Short term (2)	Short term (2)
Extent of Positive or Negative Impact	Local (2)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Moderate (3)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (36)	Medium (56)

<p style="text-align: center;">Mitigation Measures to be implemented</p>	<p>Implement suitable dust management and prevention measures during the construction phase of the proposed development.</p> <p>Construction areas and –roads to be sufficiently wetted down during the construction phase in order to prevent significant fugitive dust emissions.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint areas must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
<p style="text-align: center;">Cumulative Impact Rating after mitigation implementation</p>	Low	Low
<p style="text-align: center;">Environmental Significance Score and Rating after mitigation implementation</p>	Low (9)	Low (20)

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area	
Magnitude of Negative or Positive Impact	Low (4)	Medium (6)
Duration of Negative or Positive Impact	Short term (2)	Short term (2)
Extent of Positive or Negative Impact	Local (2)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Moderate (3)
Reversibility of Impact	Moderate (3)	Low (4)
Probability of Impact Occurrence	Low (2)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (26)	Medium (72)

Mitigation Measures to be implemented

No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. The development design layouts of the proposed wind turbine access/service road network and the 33 kV transmission line network with its access/service road network, throughout the mountaintop plateaus as well as the proposed main site access/service road and the 132 kV transmission line with its access/service road throughout the flat bottomland areas and transitional zone, must allow for continued flow through the relevant watercourses and flow paths/drainage lines. This must be done in order to maintain/ensure their ecological functionality and -integrity over time. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.

An adequate Stormwater and Erosion Management Plan must also be implemented during the construction- and operational phases of the proposed development, in order to assist with the water channelling and allow for continued flow within the local catchment. This must be done to sufficiently manage storm water runoff and clean/dirty water separation in order to attempt to maintain/ensure the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

A Water Use License Application (WULA) must furthermore be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the six (6) drainage line/flow path- and watercourse crossings, associated with the mountaintop plateaus as well as through the approximately sixty-one (61) watercourse- and drainage line/flow path crossings, associated with the flat bottomland areas and transitional zone, in accordance with the National Water Act (Act 36 of 1998).

	<p>If hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably/feasibly possible from the watercourses and water drainage lines/preferential flow paths.</p> <p>Hydrocarbon and other chemical storage areas must be adequately banded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units.</p> <p>Adequate hydrocarbon and other chemical storage, handling, usage and spillage clean-up procedures must be developed and all relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire construction phase.</p> <p>Spill kits must be readily available on the construction site. All employees must be adequately trained on the correct procedure and use of the spill kits.</p>	
<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>	<p>Low</p>
<p>Environmental Significance Score and Rating after mitigation implementation</p>	<p>Low (10)</p>	<p>Low (28)</p>

9.4.2. Operational Phase

Table 8: Environmental Risk and Significance Ratings

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Continued dust generation and emissions	
Magnitude of Negative or Positive Impact	Low (4)	Low (4)
Duration of Negative or Positive Impact	Medium term (3)	Medium term (3)
Extent of Positive or Negative Impact	Local (2)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Moderate (3)
Reversibility of Impact	High (2)	High (2)
Probability of Impact Occurrence	Medium (3)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (39)	Medium (60)

<p style="text-align: center;">Mitigation Measures to be implemented</p>	<p>All the recommended mitigation measures for the construction phase must be adequately implemented and managed.</p> <p>Implement suitable dust management and prevention measures during the operational phase of the proposed development.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p>	
<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>	<p>Low</p>
<p>Environmental Significance Score and Rating after mitigation implementation</p>	<p>Low (10)</p>	<p>Low (22)</p>

	Three mountaintop plateau assessment areas	Flat bottomland and transitional zone assessment areas
Identified Environmental Impact	Continued impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area	
Magnitude of Negative or Positive Impact	Low (4)	Medium (6)
Duration of Negative or Positive Impact	Medium term (3)	Medium term (3)
Extent of Positive or Negative Impact	Local (2)	Regional (3)
Irreplaceability of Natural Resources being impacted upon	Low (2)	Moderate (3)
Reversibility of Impact	Moderate (3)	Low (4)
Probability of Impact Occurrence	Low (2)	High (4)
Cumulative Impact Rating prior to mitigation	Low	Medium
Environmental Significance Score and Rating prior to mitigation	Low (28)	Medium-High (76)

<p>Mitigation Measures to be implemented</p>	<p>If all the recommended mitigation measures for the construction phase are adequately implemented and managed, it should prove sufficient in preventing any continued impeding-, contamination of- or significant impact on the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area.</p> <p>An adequate Stormwater and Erosion Management Plan must also be implemented during the construction- and operational phases of the proposed development, in order to assist with the water channelling and allow for continued flow within the local catchment. This must be done to sufficiently manage storm water runoff and clean/dirty water separation in order to attempt to maintain/ensure the ecological functionality and - integrity of the local and broader quaternary surface water catchment- and drainage area.</p>	
<p>Cumulative Impact Rating after mitigation implementation</p>	<p>Low</p>	<p>Low</p>
<p>Environmental Significance Score and Rating after mitigation implementation</p>	<p>Low (11)</p>	<p>Low (30)</p>

10. Summary and Conclusion

According to SANBI (2006-2019), the three mountaintop plateau assessment areas form part of the Lower Gariiep Broken Veld vegetation type (NKb 1). The flat bottomland assessment areas surrounding the mountain range, however fall within the Bushmanland Arid Grassland vegetation type (NKb 3). Both of these vegetation types are classified as Least Concerned (SANBI, 2006-2019).

The entirety of the three mountaintop plateau- and the flat bottomland assessment areas form part of a broad mosaic of Ecological Support Area (ESA) and Other Natural Area (ONA), according to the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province.

Water Catchment and Drainage

The proposed wind turbine access/service road network and the 33 kV electrical transmission line network with its associated access/service road network, will merely traverse five (5) small ephemeral water drainage lines/preferential flow paths as well as a single significant first-order ephemeral watercourse, throughout the three mountaintop plateaus. These drainage lines/flow paths and single significant watercourse assist with channelling and discharging surface water runoff from small portions of the mountaintop plateaus, towards the surrounding flat bottomland areas. From a hydrological perspective, these drainage lines/flow paths and single significant watercourse therefore merely play a minor assisting role in the local catchment and drainage, associated with surface water runoff from the mountain range.

These drainage lines/flow paths and single significant watercourse are therefore not viewed as being of high conservational significance/value, from a hydrological or ecological perspective. It is however not anticipated that the proposed development at these flow path/drainage line- and single significant watercourse crossings, should significantly impede or impact on their flow regimes.

The proposed main site access/service road and the 132 kV electrical transmission line with its associated access/service road, will traverse numerous significant ephemeral watercourses as well as smaller ephemeral water drainage lines/preferential flow paths at approximately sixty-one (61) locations, throughout the flat bottomland areas and transitional zone. These watercourses and drainage lines/flow paths are responsible for a significant portion of the local catchment and drainage, associated with surface water runoff throughout the flat bottomland areas surrounding the mountain range. The significant watercourses therefore form an important part of the local and broader quaternary surface water catchment- and drainage area. It is however not anticipated that the proposed development at these significant watercourse- and flow path/drainage line crossings, should significantly impede or impact on their flow regimes.

Due to the lack of continuous water flow throughout the mountaintop plateaus and flat bottomland areas surrounding the mountain range, none of the watercourses and flow paths/drainage lines possess any distinct riparian zones or significant variations in vegetation species composition or -structure, relative to the surrounding terrestrial landscape. Merely slight to moderate increases in density of woody shrub individuals are evident within- and along the edges of the significant watercourses.

No transmission line pylons may be constructed inside- or within 20 m of any watercourse- or flow path/drainage line crossings. The development design layouts of the proposed wind turbine access/service road network and the 33 kV transmission line network with its access/service road network, throughout the mountaintop plateaus as well as the proposed main site access/service road and the 132 kV transmission line with its access/service road throughout the flat bottomland areas and transitional zone, must allow for continued flow through the relevant watercourses and flow paths/drainage lines. This must be done in order to maintain/ensure their ecological functionality and -integrity over time. Disturbed areas within and immediately surrounding the proposed watercourse- and flow path/drainage line crossings, must be adequately rehabilitated concurrently with the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.

An adequate Stormwater and Erosion Management Plan must also be implemented during the construction- and operational phases of the proposed development, in order to assist with the water channelling and allow for continued flow within the local catchment. This must be done to sufficiently manage storm water runoff and clean/dirty water separation in order to attempt to maintain/ensure the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

A Water Use License Application (WULA) must furthermore be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the six (6) drainage line/flow path- and watercourse crossings, associated with the mountaintop plateaus as well as through the approximately sixty-one (61) watercourse- and drainage line/flow path crossings, associated with the flat bottomland areas and transitional zone, in accordance with the National Water Act (Act 36 of 1998).

Current Existing Vegetation and Site Description

The three mountaintop plateaus all constitute relatively homogenous, flat to slightly undulating grassy karroid shrubland landscapes. Merely slight variations in vegetation species composition and representation are evident throughout certain areas. These variations are however deemed negligible in the ecological context of the landscape.

The applicant intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. **It is therefore recommended that a sufficient game management plan and practices must be implemented for the proposed wildlife camp, in order to adequately manage the camp and to attempt to improve/restore the ecological condition, over time. The Game Management Plan must be compiled by a suitably qualified and experienced ecologist.**

The flat bottomland areas form part of an extensive intertwined mosaic of mainly karroid shrubland landscape and to a lesser extent, karroid shrubby grassland landscape. The majority of the 132 kV electrical transmission line and its associated access/service road, will however traverse a significantly undulating transitional zone between the mountaintop plateaus and the flat bottomland areas surrounding the mountain range.

The mountaintop plateaus and the flat bottomland areas are mainly utilised by commercial farmers as well as local informal subsistence farmers/land users for livestock grazing purposes. The ecology of the landscape is in a predominantly natural and functional state, although slight disturbance as a result of historic and continued long-term overgrazing, is evident throughout certain areas of the mountaintop plateaus and the majority of the flat bottomland areas. **It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local farmers/land users, in order to prevent continued significant overgrazing of the landscape and to attempt to improve/restore the ecological condition, over time.**

Red Data Listed-, nationally protected- and other provincially protected plant species

A significant increase in soil surface rockiness and associated shallower soils are evident all along the outer perimeters and cliffs of the mountaintop plateaus. Such areas are also mainly associated with increased slope gradients towards the cliffs. These areas possess different and locally distinct vegetation species composition and -structure, with higher succulent- and conservationally significant species diversity, relative to the majority grassy karroid shrubland landscape of the mountaintop plateaus. The presences of the provincially protected species *Euphorbia avasmontana* as well as the provincially specially protected species *Aloe dichotoma* are significantly more prominent throughout such areas, while habitat-specific succulent species such as the two provincially protected species *Cotyledon orbiculata* and *Euphorbia mauritanica*, are diagnostically confined to such areas. Numerous clusters of the provincially protected species *Ammocharis coranica* were furthermore found at the initial laydown area location of wind turbine number B22, which forms part of the outer perimeter and cliff of the mountaintop plateau.

Due to the increased soil surface rockiness and associated different vegetation species composition and -structure, these outer perimeters and cliffs of the mountaintop plateaus also possess locally distinct and important faunal habitat attributes/features. It is therefore reasonably expected that such areas are likely utilised by various common and habitat-specific faunal (reptilian and mammalian) species as refuge and for breeding, foraging and persistence purposes.

Three (3) clusters of the provincially protected species *Euphorbia avasmontana* were found to be present along the proposed access/service road portions towards wind turbine numbers B02 & D05. Four (4) clusters of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B03, B07, B09 & D01, respectively. This equates to a total of seven (7) *Euphorbia avasmontana* clusters, which are associated with the proposed wind power development footprint areas.

Merely a single (1) cluster of the provincially protected species *Euphorbia avasmontana* was found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

Three (3) individuals of the provincially specially protected species *Aloe dichotoma* were found to be present along the proposed access/service road portions towards wind turbine numbers B02, B03 & B12. Single individuals of this species were further also found to be present at the initial laydown area locations of wind turbine numbers B01, B09 & B22, respectively. This equates to a total of six (6) *Aloe dichotoma* individuals, which will have to be destroyed/removed for the proposed wind power development.

Two (2) individuals of the provincially specially protected species *Aloe dichotoma* were also found to be present along the portion of the proposed 132 kV transmission line and its associated access/service road, which traverses the significantly undulating transitional zone.

The grassy karroid shrubland landscape of the mountaintop plateaus, are also sparsely covered by individuals of the nationally protected tree species *Boscia albitrunca*. The average density of this species throughout the mountaintop plateaus, was calculated to be approximately 4 individuals/ha. A minimum counted estimate of approximately 110 individuals were found to be present throughout the approximately 33.64 ha associated with the proposed wind turbine laydown areas and electrical combiner footprint areas as well as throughout the access/service road networks. These individuals will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height). Merely six (6) individuals of ≥ 2 m in height and a further nine (9) significantly sized individuals (≥ 3 m in height) were found to be present within close proximity to the proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The karroid shrubland- and karroid shrubby grassland landscapes of the flat bottomland areas, are also extensively covered by individuals of the nationally protected tree species *Boscia albitrunca*. The significantly undulating transitional zone associated with the majority of the proposed transmission line and its associated access/service road, is also sparsely covered by this species. Narrow linear physical footprint sections of approximately 7 m in width (shoulders included) and 4 m in width, will respectively be cleared of vegetation for the entire proposed main site access/service road and the access/service road associated with the transmission line. They will also be maintained as such, over time.

Minimum counted estimates of approximately 160 and 100 individuals were respectively found to be present along the proposed main site access/service road- as well as the proposed transmission line and its associated access/service road routes, which traverse the flat bottomland areas and transitional zone surrounding the mountain range. This equates to a total of approximately 260 *Boscia albitrunca* individuals, which will have to be destroyed/removed for the proposed wind power development. Virtually all of these individuals however constitute low-growing, coppicing shrubs (≤ 1.5 m in height), while merely fifteen (15) individuals of ≥ 2 m in height and a further ten (10) significantly sized individuals (≥ 3 m in height) were found to be present along the proposed main site access/service road route. A further nine (9) individuals of ≥ 2 m in height and a single (1) significantly sized individual (≥ 3 m in height) were also found to be present along the proposed transmission line and its associated access/service road route.

The provincially protected species *Jamesbrittenia incisa*, *Ruschia spinosa* and *R hamata* were merely found to be sparsely present, while a single cluster of the provincially protected species *Aloe claviflora* was found to be present along the proposed access/service road portion towards wind turbine number B10.

Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were also found to be present in close proximity to the initially proposed wind turbine laydown areas, electrical combiner footprint areas as well as the proposed wind turbine access/service road network and the transmission line network with its associated access/service road network.

The provincially protected species *Euphorbia mauritanica* was found to be well-represented throughout the flat bottomland areas, while the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* were merely found to be sparsely present. Merely three (3) individuals of the provincially specially protected species *Hoodia gordonii* were found to be present along the proposed main site access/service road route. A further seven (7) individuals of this species were also found to be present along the portion of the proposed transmission line and its associated access/service road, which traverses the significantly undulating transitional zone. This equates to a total of ten (10) *Hoodia gordonii* individuals.

Apart from the species discussed above, no Red Data Listed-, other nationally protected- or other provincially protected plant species or any other plant species of conservational significance/value, were found to be present throughout any of the proposed development areas, associated with the three mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range.

A Moratorium is currently in place in the Northern Cape Province, that prohibits the destruction/removal of *Aloe dichotoma* individuals. It is therefore recommended that all of the identified eight (8) *Aloe dichotoma* individuals must be left intact. The identified individuals associated with the wind turbine laydown areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 10 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified individuals. This must be done in order to attempt to ensure their continued subsistence and longevity.

It is recommended that the outer perimeters and cliffs of the mountaintop plateaus be adequately buffered out of the proposed development footprint areas. No current or future development is allowed to take place within such buffered zones. Based on this recommendation along with the specific presences of clusters and individuals of the provincially protected species *Euphorbia avasmontana*, *Cotyledon orbiculata*, *Euphorbia mauritanica* and *Ammocharis coranica* as well as the provincially specially protected species *Aloe dichotoma*, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these ecologically/conservationally significant/sensitive areas and -species individuals:

- B01, B03, B07, B09, B15 & B22
- D01
- F03

The access/service road associated with the proposed 132 kV transmission line, must be adequately diverted around the identified *Euphorbia avasmontana* cluster, associated with the flat bottomland areas and transitional zone surrounding the mountain range. This must be done in order to attempt to ensure its continued subsistence and longevity.

A Protected Tree License has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any nationally protected tree species individuals. It is however recommended that all of the identified thirty (30) *Boscia albitrunca* individuals of $\geq 2\text{m}$ in height and the identified twenty-one (20) significantly sized *Boscia albitrunca* individuals ($\geq 3\text{m}$ in height), must be left intact. The identified individuals associated with the wind turbine laydown areas and electrical combiner footprint areas must be adequately buffered out of the proposed development footprint areas. A minimum approximately 15 m buffer distance must be implemented around each of these individuals. No current or future development is allowed to take place within such buffered zones. The proposed access/service road- and 33 kV transmission line networks as well as the main site access/service road and the access/service road associated with the proposed 132 kV transmission line, must also be adequately diverted around the identified locally significant individuals. This must be done in order to attempt to ensure their continued subsistence and longevity. Based on this recommendation, the positions of the following wind turbines and their laydown areas were subsequently proactively relocated by the applicant, away from any of these locally significant nationally protected tree individuals:

- B21, B23
- Northern electrical combiner

It is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed removal/destruction of nationally protected tree species individuals.

A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform, prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified provincially protected species individuals. It is however recommended that the single cluster of the identified provincially protected species *Aloe claviflora*, must be adequately relocated to another suitable and similar area as to where it was removed from. It is also recommended that representative numbers of individuals/clusters of the provincially protected species *Aloe claviflora* and *Euphorbia braunsii* as well as all ten (10) identified individuals of the provincially specially protected species *Hoodia gordonii* identified throughout the flat bottomland areas and transitional zone surrounding the mountain range, must be adequately relocated to another suitable and similar area as to where they were removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced ecologist.

Due to the subsequent relocation of certain wind turbines and their laydown areas as discussed earlier above, it is however not anticipated that the identified *Hoodia gordonii* individuals associated with the mountaintop plateaus, will be directly affected by the proposed development. It is therefore recommended that they must be left intact. The proposed access/service road portion towards wind turbine number D05, must also be adequately diverted around the single identified individual, which was found to be present there.

Fauna and Avifauna

This ecological assessment does not include an Avifaunal or Bat Assessment. Due to the nature and magnitude of potential ecological impacts of the proposed wind power development on avifauna, it was recommended prior to the commencement of the ecological assessment, that an avifaunal specialist must be appointed to conduct a separate Avifaunal Assessment. This assessment must specifically determine the potential impacts of the proposed wind power development on avifauna in the area and provide recommendations regarding mitigation of identified impacts as well as the overall suitability/acceptability of the proposed development area.

No conservationally significant or important faunal species or locally distinct faunal habitats were observed throughout the mountaintop plateaus or the flat bottomland areas and transitional zone surrounding the mountain range. Due to the undeveloped relatively natural state of the mountaintop plateaus as well as the flat bottomland areas and transitional zone, it is however reasonably expected that the local and broader area will likely be utilised by various common reptilian-, small antelope- as well as meso-predatory- and other mammalian species as refuge and for breeding, foraging and persistence purposes. The mobility of faunal species along with the vast, continuous undeveloped surrounding natural landscape, allows for faunal individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

Conclusion

The mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range, both scored moderate Ecological Importance and Sensitivity (EIS) values and are therefore viewed as being of moderate conservational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, broader vegetation type, Ecological Support Area (ESA), nationally- and provincially protected species individuals and the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The mechanical clearance associated with the proposed development, will in all probability completely transform the majority of the existing surface vegetation throughout all the different footprint areas, associated with the mountaintop plateaus as well as the flat bottomland areas and transitional zone surrounding the mountain range. The combined total size of all these different proposed footprint areas, is however minute relative to the landscape surrounding them. The small wind turbine laydown areas are also spread-out and spaced far apart throughout the mountaintop plateaus. The local and broader region surrounding the assessment areas furthermore constitutes a vast, continuous undeveloped natural landscape. The applicant also intends to establish and manage the three mountaintop plateaus as an eco-friendly wildlife camp. It is consequently not anticipated that the proposed development would necessarily pose any significant risk to achieving and maintaining national and/or provincial conservation and persistence targets of the area or to the continued ecological functionality and -integrity of the local and broader surrounding landscape.

Destruction of-/damage to Red Data Listed, nationally- and/or provincially protected species individuals/habitats associated with the assessment area, terrestrial and aquatic alien invasive species establishment throughout the flat bottomland areas and transitional zone surrounding the mountain range as well as impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as significant potential long-term ecological impact, associated with the construction phase of the proposed development.

Continued impeding and contamination of the flow regimes of the numerous watercourses and water drainage lines/preferential flow paths, within the associated local and broader quaternary surface water catchment- and drainage area was furthermore identified and addressed as a continued significant potential long-term ecological impact, associated with the operational phase of the proposed development.

Although the broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape, the proposed development merely forms a small part of the first phase of a significantly sized and extensive renewable energy power generating hub, which is envisaged for the broader area to the south of the town of Prieska, over time. Significant future development expansion and subsequent transformation in the same geographical area, which could likely lead to further cumulative ecological impacts, will therefore in all probability take place within the local and broader area, over time.

The significant potential long-term ecological impacts identified for the proposed development, could therefore potentially add moderate cumulative impact to the existing and anticipated future negative impacts, associated with the envisaged significantly sized and extensive renewable energy power generating hub, over time.

It is however the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential cumulative ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures. It is therefore not anticipated that the proposed development will add any significant residual cumulative ecological impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report are adequately implemented and managed, for both the construction- and operational phases of the proposed development.

It is the opinion of the specialist that the proposed development of the assessment areas should be considered by the competent authority, for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report must however be adequately implemented and managed for both the construction and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

11. References

Collins, N.B. 2018. Free State Province Biodiversity Plan: Technical Report v1.0. Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs. Internal Report.

Conservation of Agricultural Resources Act (Act 43 of 1983)

Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

National Environmental Management Act (Act 107 of 1998)

National Environmental Management: Biodiversity Act (Act 10 of 2004)

National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014

National Forests Act (Act 84 of 1998)

National Water Act (Act 36 of 1998)

Northern Cape Nature Conservation Act (Act 9 of 2009)

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Van Oudtshoorn, F. 2004. Gids tot Grasse van SuidAfrika. 2nd Ed. Briza Publikasies.

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12. Details of the Specialist

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M.Env.Sci. Ecological remediation and sustainable utilisation (NWU: Potchefstroom)

South African Council for Natural Scientific Professions (SACNASP): Professional Ecological Scientist
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Abbreviated Curriculum Vitae

Qualifications

- M.Env.Sci Ecological Remediation and Sustainable Utilisation/Vegetation Ecology
 - 2010 - North West University Potchefstroom
- B.Sc Botany and Zoology (Cum Laude)
 - 2008 - North West University Potchefstroom

Accredited courses completed

- Implementing Environmental Management Systems ISO 14001
 - 2011 - North West University Potchefstroom
- Environmental Law for Environmental Managers
 - 2011 - North West University Potchefstroom
- SASS 5 Aquatic Biomonitoring Training Course
 - 2017 – GroundTruth Consulting

Professional registrations

- South African Council for Natural Scientific Professions (**SACNASP**)
 - Professional Ecological Scientist Registration number 115601
- International Association for Impact Assessment (**IAIA**)
 - Registration number 5232
- South African Green Industries Council (**SAGIC**) Invasive Species training
 - Registration number 2405/2459

Employment and Experience Background

Upon completion of his studies, Rikus started his career in 2011 as an **Environmental Professional in Training (PIT) at Anglo American Thermal Coal: Environmental Services**. He received environmental training and practical implementation experience in all environmental facets of the mining industry with the focus on: Environmental rehabilitation, land management (biodiversity and invasive species eradication), waste & water-, air quality-, game reserve-, environmental management and legislation, as well as corporate reporting. He was also appointed as the Biodiversity management custodian at Anglo American Thermal Coal collieries.

He was subsequently employed by **Fraser Alexander Tailings from October 2011 to the end of November 2015 as an Environmental Contracts Manager**, where he was responsible for the technical and operational management of all Fraser Alexander Tailings' mining environmental rehabilitation work. He was responsible for all facets of project management, as well as implementation of rehabilitation and environmental strategies, by planning activities, organising physical, financial and human resources, delegating task responsibilities, leading people, controlling risks and providing technical support.

He conducted a significant amount of quantitative and qualitative ecological vegetation monitoring during his employment period with the company. Such monitoring mainly included environmentally rehabilitated mining areas in the open-cast coal-, gold-, platinum- and chrome mining industries situated in the Free State, Gauteng, Mpumalanga, North West and Limpopo Provinces. He was involved with analysis, processing and interpretation of environmental monitoring data and compilation of high quality technical/scientific environmental monitoring reports for clients. He was subsequently further involved with providing adequate ecological management and maintenance recommendations for rehabilitated areas. He also provided technical/scientific environmental rehabilitation support to mining clients, with regards to sufficient soil preparation and amelioration, grassing processes, as well as grass species mixtures and ratios.

He was then employed by **Enviroworks Consulting from January 2016 to the end of May 2017 as a Senior Ecological Specialist** where he was responsible for virtually all Ecological, Aquatic and Wetland specialist assessments and reporting related to Environmental Impact Assessment (EIA) and Basic Assessment (BA) projects. He also completed numerous EIA and BA projects as the main project Environmental Assessment Practitioner (EAP).

Rikus then subsequently established the company EcoFocus Consulting (Pty) Ltd at the end of May 2017, which provides high quality professional environmental and ecological specialist services and solutions to the industrial development-, construction-, mining-, agricultural and other sectors.

He possesses significant qualifications, vast knowledge, skills and practical experience in the specialist field of ecological and environmental management. This, coupled with his disciplined, determined and goal-driven approach, as well as his high level of personal standards, ensure high quality, timely and outcomes-based outputs and service delivery relating to any project.

Ecological & Wetland Specialist Assessment & Report Completion for the last two years

2022

- Aquatic Ecological Assessment for the proposed 178 ha A1 Groblershoop 50 MW PV Solar Plant Development, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment for the proposed 178 ha A1 Groblershoop 50 MW PV Solar Plant Development, Northern Cape Province.
- Proposed 14.3 ha North West Department of Education Ga-Maloka Primary School Expansion project in Ga-Maloka, North West Province.
- Aquatic Ecological Site Verification Report for the proposed 661 ha Khauta Solar PV Cluster Development, Riebeeckstad, Free State Province.
- Grazing and Invasive Species Assessment for the Farm Fourina No. 362 outside Fouriesburg, Free State Province.
- Desktop ecological assessment for the proposed 2.7 ha Muller Composting Abattoir and Composting Facility Development near Frankfort, Free State Province.
- Proposed 5.22 ha Equity Properties Midway Guesthouse Development in Bloemfontein, Free State Province.
- Proposed 1.5 ha Reeco Holdings (Pty) Ltd 15 Eco-villa Units Development near Ritchie, Northern Cape Province.

- Proposed 63.4 ha Kareeberg Local Municipality Carnarvon Residential Development, Northern Cape Province.
- Legal comments and responses for the Grazing and Invasive Species Assessment for the Farms Liebenbergsvlei No. 148 & Aasvogelkrans No. 96, outside Bethlehem, Free State Province.
- Legal comments and responses for the Grazing and Invasive Species Assessment for the Farm Erfenis No. 1014, outside Bethlehem, Free State Province.
- Proposed 16.8 ha Mafube Local Municipality Strasburg Mixed Land Use Development, Frankfort, Free State Province.
- Revision of the Basic Assessment process for a poultry broiler facility on the Farm Dwarsfontein 1 IQ, near Derby, North West Province.
- Aquatic Ecological Assessment for the proposed 101 ha 80 MW Khauta West Solar PV Facility Development, Riebeeckstad, Free State Province.
- Aquatic Ecological Assessment for the proposed 87 ha 50 MW Khauta e Nyane Solar PV Facility Development, Riebeeckstad, Free State Province.
- Aquatic Ecological Assessment for the proposed 168 ha 110 MW Khauta South Solar PV Facility Development, Riebeeckstad, Free State Province.
- Aquatic Ecological Assessment for the proposed 273 ha 165 MW Khauta North Solar PV Facility Development, Riebeeckstad, Free State Province.

2021

- Proposed 126.77 ha Orania Residential development project in Orania, Northern Cape Province.
- Grazing and Invasive Species Follow-up Assessment for the Farm Tweefontein no 3344, outside Newcastle, KwaZulu-Natal Province.
- Proposed 245.5 ha Kgatelopele Local Municipality Residential development project in Danielskuil, Northern Cape Province.
- Relocation of provincially protected plant species individuals for the proposed 30 ha Portion 30 of the Farm Lilyvale no 2313 Residential development project in Bloemfontein, Free State Province.
- Proposed 0.5 ha Mduwelanga Projects Agricultural development project outside Paul Roux, Free State Province.
- Proposed Moledi Gorge Watercourse Weir NEMA Section 24G development outside Derby, North West Province.

- Revision of a proposed 135 ha Farm Zulani no 167 agricultural development project outside Douglas, Northern Cape Province.
- Grazing and Invasive Species Assessment for the Farm Kuilenburg no 241, outside Reitz, Free State Province.
- Revision of the Biodiversity Offset Feasibility Report for a proposed 385 ha Idstone Farming agricultural development projects outside Douglas, Northern Cape Province.
- Erosion and Invasive Species Assessment for the Farms Nebo A no 957, Tevrede no 1088, Sarona no 1089 & Uitkyk no 1119, outside Reitz, Free State Province.
- Proposed 267.2 ha Tswaing Local Municipality residential development project in Ottosdal, North West Province.
- Proposed 10.2 ha PepsiCo Inc residential development project in Marchand, Northern Cape Province.
- Proposed 182 ha Farm Selosesha no 900 mixed land use development project in Thaba Nchu, Free State Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 182 ha Farm Selosesha no 900 mixed land use development project in Thaba Nchu, Free State Province.
- Proposed 3.5 ha Itau Milling NEMA Section 24G Solar Power Development project in Bloemfontein, Free State Province.
- Grazing and Invasive Species Assessment for the Farm Brakfontein no 244, outside Verkykerskop, Free State Province.
- Wetland/watercourse Assessment for the proposed 250 ha Subsolar Energy Serurubele Solar Development project near Bloemfontein, Free State Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 250 ha Subsolar Energy Serurubele Solar Development project near Bloemfontein, Free State Province.
- Wetland/watercourse Assessment for the proposed 171 ha Subsolar Energy Sonneblom Solar Development project near Bloemfontein, Free State Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 171 ha Subsolar Energy Sonneblom Solar Development project near Bloemfontein, Free State Province.
- Proposed 13.6 ha Haldon Estate development project in Bloemfontein, Free State Province.
- Wetland/watercourse Assessment for the proposed 200 ha Subsolar Energy Delta Solar Development project near Bloemhof, North West Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 200 ha Subsolar Energy Delta Solar Development project near Bloemhof, North West Province.

- Water Use License Application (WULA) Specialist Opinion and Recommendation Letter for the proposed three Subsolar Energy Solar Development projects.
- Grazing and Invasive Species Follow-up Assessment for the Farm Waterval West no 653, outside Steynsrus, Free State Province.
- Proposed 25 ha Letsemeng Local Municipality landfill site development project in Luckhof, Free State Province.
- *Vachellia erioloba* Counting Report for the proposed 286 ha Subsolar Energy Gamma Solar Development project near Vryburg, North West Province.
- *Vachellia erioloba* Counting Report for the proposed 243 ha Subsolar Energy Khubu Solar Development project near Vryburg, North West Province.
- *Vachellia erioloba* Counting Report for the proposed 224 ha Subsolar Energy Protea Solar Development project near Vryburg, North West Province.
- *Vachellia erioloba* Counting Report for the proposed 262 ha Subsolar Energy Impala Solar Development project near Vryburg, North West Province.
- *Vachellia erioloba* Counting Report for the proposed 265 ha Subsolar Energy Sonbesie Solar Development project near Vryburg, North West Province.
- Ecological site suitability assessments for three potential 583 ha, 300 ha and 227 ha Alt-e Developments Herbert Phase 2 Solar Power Facility development projects near Douglas, Northern Cape Province.
- Proposed 113 ha Danrika Boerdery Edms BPK Vineyard Development project near Prieska, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 120 ha Northern Cape Department Agriculture Agricultural Development outside Hopetown, Northern Cape Province.
- Ecological Rehabilitation and Alien Invasive Species Management Plan for a proposed 120 ha Northern Cape Department Agriculture Agricultural Development outside Hopetown, Northern Cape Province.
- Protected Plant Species Management Plan for a proposed 120 ha Northern Cape Department Agriculture Agricultural Development outside Hopetown, Northern Cape Province.
- Ecological Stormwater and Erosion Management Plan for a proposed 120 ha Northern Cape Department Agriculture Agricultural Development outside Hopetown, Northern Cape Province.
- GIS Master Layout Plan for a proposed 120 ha Northern Cape Department Agriculture Agricultural Development outside Hopetown, Northern Cape Province.

- Grazing and Invasive Species Follow-up Assessment for the Farm Klipfontein No 71 outside Lindley, Free State Province.
- Proposed 384.3 ha Prieska Power Reserve Solar Power Facility Development outside Prieska, Northern Cape Province.
- Aquatic Ecological Assessment for the proposed Farm Bullhoek Chicken Layer Houses and Evaporation Ponds Expansion near Swartruggens, North West Province.
- Water Use License Application (WULA) Risk Assessment for the proposed Farm Bullhoek Chicken Layer Houses and Evaporation Ponds Expansion near Swartruggens, North West Province.
- Grazing and Invasive Species Assessment for the Farm Kleine Fontein No 1160 outside Bergville, KwaZulu-Natal Province.
- Proposed 1.37 km Mantsopa Local Municipality Water Pipeline Development in Ladybrand, Free State Province.
- Water Use License Application (WULA) Risk Assessment for the proposed 1.37 km Mantsopa Local Municipality Water Pipeline Development in Ladybrand, Free State Province.
- Grazing and Invasive Species Assessment for the Farm Elizabeth No 220 outside Bethlehem, Free State Province.
- Grazing and Invasive Species Follow-up Assessment for the Farm Retiefs Nek No 123 outside Bethlehem, Free State Province.
- Grazing and Invasive Species Follow-up Assessment for the Farm Brakfontein No 244, outside Verkykerskop, Free State Province.
- Proposed 107.8 ha Danrika Boerdery Edms BPK NEMA Section 24G Development project near Prieska, Northern Cape Province.

2020

- Proposed 120 ha Northern Cape Department Agriculture Hopetown Agricultural Development outside Hopetown, Northern Cape Province.
- Proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.

- Rehabilitation and Alien Invasive Species Management Plan for a proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.
- Protected Species Relocation Management Plan for a proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.
- Stormwater Management Plan for a proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.
- GIS Master Layout Plan for a proposed 3.27 ha Lynette Brand Ritchie NEMA Section 24G river lodge development project in Ritchie, Northern Cape Province.
- Preliminary Ecological Specialist Findings and Opinion Letter for the proposed 294 ha Northern Cape Department Agriculture Bucklands Agricultural Development, Douglas Northern Cape Province.
- Proposed 1.58 km Dihlabeng Local Municipality Sewer Bridge and Pipeline Development, Paul Roux, Free State Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 1.58 km Dihlabeng Local Municipality Sewer Bridge and Pipeline Development, Paul Roux, Free State Province.
- Rehabilitation and Alien Invasive Species Management Plan for a proposed 1.58 km Dihlabeng Local Municipality Sewer Bridge and Pipeline Development, Paul Roux, Free State Province.
- Proposed 2064 ha Free State Strategic Solar Project Development outside Bethulie, Free State Province.
- Proposed 7.83 ha Carpe Diem Raisins NEMA Section 24G Evaporation Pond Development project outside Upington, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment for a proposed 7.83 ha Carpe Diem Raisins NEMA Section 24G Evaporation Pond Development project outside Upington, Northern Cape Province.
- Desktop Protected Species and Alien Invasive Species Management Plan for a proposed Northern Cape N 8 & N 10 highway maintenance project between Britstown, Prieska, Groblershoop and Upington, Northern Cape Province.
- Proposed 10.7 ha Dikgatlong Local Municipality NEMA Section 24G residential development in Barkly West, Northern Cape Province.
- Erosion and Rehabilitation Monitoring Report for the Farms Die Kranse no 1174 and De Rotsen no 52 outside Vrede, Free State Province.
- Grazing and Invasive Species Management Plan for the Farm Tweefontein no 3344, outside Newcastle, KwaZulu-Natal Province.

- Grazing and Invasive Species Management Plan for the Farm Malpha Noord no 1063, outside Senekal, Free State Province.
- Grazing and Invasive Species Management Plan for the Farm Mizpah no 706, outside Memel, Free State Province.
- Grazing and Invasive Species Management Plan for the Farm Welgelegen no 102, outside Clarens, Free State Province.
- Proposed 123 ha Slovo Park Residential development project in Brandfort, Free State Province.
- Proposed 2.43 ha Zeekoefontein Resort development project in Vaal Oewer, Gauteng Province.
- Grazing and Invasive Species Assessment for the Farm De Hoek no 1238, outside Bethlehem, Free State Province.
- Proposed 236 ha Northern Cape Department Agriculture Bucklands Agricultural Development outside Douglas, Northern Cape Province.
- Proposed 9.1 ha Motheo College Expansion NEMA Section 24G development in Bloemfontein, Free State Province.
- Proposed 84.7 ha Sol Plaatje Local Municipality Residential development project in Kimberley, Northern Cape Province.
- Proposed 201 ha Siyathemba Local Municipality Residential development project in Prieska, Northern Cape Province.
- Proposed 60.2 ha Siyancuma Local Municipality Residential development project in Douglas, Northern Cape Province.
- Proposed 58.9 ha Maremane Communal Property Association Residential development project in Maremane, Northern Cape Province.
- Proposed 15 ha Maketshemo Trading Filling Station and Truckstop development project in Winburg, Free State Province.
- Rehabilitation and Alien Invasive Species Management Plan for the Moledi Gorge Watercourse Weir decommissioning outside Derby, North West Province.
- GIS Master Layout Plan for a proposed 35 ha Gladium Boerdery Familietrust NEMA Section 24G agricultural development project outside Niekerkshoop, Northern Cape Province.
- Proposed 46.5 ha Siyathemba Local Municipality Residential development project in Niekerkshoop, Northern Cape Province.
- Proposed 475 m Setsoto Local Municipality Pipeline development and water treatment works upgrade project in Clocolan, Free State Province.