BOULDERS WIND FARM NEAR VREDENBURG:

FAUNA & FLORA SPECIALIST IMPACT ASSESSMENT REPORT

PRODUCED FOR SAVANNAH ENVIRONMENTAL & EOH

ON BEHALF OF VREDENBURG WINDFARM PTY (LTD)

BY

3Foxes Biodiversity Solutions

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NEMA 2014 CHECKLIST - APPENDIX 6 OF THE EIA REGULATIONS, 2014 (AS AMENDED)

Section		*NEMA 2014 Regulations (as amended) for Specialist Studies*	Position in report (pg.)	check
1	1	A specialist report prepared in terms of these Regulations must contain—		
	(a)	details of-		
		(i) the specialist who prepared the report; and	5	✓
		(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	5	
	(b)	a declaration that the person is independent in a form as may be specified by the competent authority;	6	✓
	(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1	✓
		(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.3	
		(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 3.4	
	(d)	the duration, date and season of the site investigationand the relevance of the season to the outcome of the assessment	Section 1.3	
	(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2	✓
	(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 3.7	
	(g)	an identification of any areas to be avoided, including buffers;	Section 3.7	
	(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 3.7	
	(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3	✓
	(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;;	Section 3	✓
	(k)	any mitigation measures fir inclusion in the EMPr	Section 6	
	(l)	any conditions for inclusion in the environmental authorisation;	N/A	
	(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6	✓
	(n)	a reasoned opinion		
		(i) whether the proposed activity, activities or portions thereof should be authorised; and	Section 7	

Section		*NEMA 2014 Regulations (as amended) for Specialist Studies*	Position in report (pg.)	check
		(iA) regarding the acceptability of the proposed activity or activities	Section 7	
		(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mititgation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 7	
	(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	See main EIA report	✓
	(p)	a summary and copies of any comments that were received during any consultation process and where applicable all responses thereto; and	See main EIA report	✓
	(q)	any other information requested by the competent authority.	N/A	
	2	Where a proposed development and the geographical area within which it is located has been subjected to a pre-assessment using a spatial development tool, and the output of the pre-assessment in the form of a site specific development protocol has been adopted in the prescribed manner, the content of a specialist report may be determined by the adopted site specific development protocol applicable to the specific proposed development in the specific geographical area it is proposed in.	N/A	✓

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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Ecological Solutions for People & the Environment

Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.
Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.
Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.
Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Recent experience and relevant projects include the following:

- Hartebeest Wind Farm, Moorreesburg: Fauna & Flora Specialist EIA Study. Savannah Environmental 2016.
- Juno Wind Farm near Strandfontein: Fauna & Flora Specialist Study. Arcus 2018.
- Gas-Fired Independent Power Plant, Saldanha Bay: Faunal Ecology Specialist Study. ERM 2016.
- Kap Vley Wind Farm near Kleinsee. CSIR 2018.
- Klawer Wind Farm. Savannah Environmental 2016.
- Esizayo Wind Energy Facility, Roggeveld. WSP Environmental 2016.
- Maralla Wind Energy Facility, Roggeveld. WSP Environmental 2016.
- San Kraal Wind Energy Facility, Noupoort. Arcus 2017.
- Phezokomoya Wind Energy Facility, Noupoort. Arcus 2017.
- Proposed Weskusfleur Substation at Koeberg. Lidwala Consulting Engineers. 2015.

SPECIALIST DECLARATION

I, ..Simon Todd....., as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

-
- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: _____

Name of Specialist: ____Simon Todd_____

Date: ____02 December 2018_____

1 INTRODUCTION

Vredenburg Windfarm Pty (Ltd) are proposing to develop the Boulders Wind Farm with a contracted capacity of up to 140MW located near to Vredenburg in the Western Cape Province. Although Vredenburg Windfarm Pty (Ltd) had appointed Savannah Environmental as the independent Environmental Assessment Practitioner (EAP) to undertake the required environmental authorisation process for the proposed Boulders Wind Farm, the final submission has been transferred to EOH. The authorisation process is currently in the EIA phase and EOH has appointed 3Foxes Biodiversity Solutions to provide a specialist terrestrial fauna and flora specialist impact assessment study of the proposed development as part of the EIA process.

The purpose of the terrestrial fauna and flora specialist impact assessment study is to describe and detail the ecological features of the proposed site; provide an assessment of the ecological sensitivity of the site and identify and assess the likely impacts associated with the proposed development on the site as a wind energy facility. A desktop review of the available ecological information for the area as well as a site visit and field assessment is used to identify and characterise the ecological features of the site. This information is used to derive an ecological sensitivity map that presents the ecological constraints for development at the site. Impacts are assessed for the construction, operation, and decommissioning phases of the development. Cumulative impacts on the broader area are also considered and assessed. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development, which should be included in the Environmental Management Programme (EMPr) for the development. The full scope of the study is detailed below and is in accordance with Appendix 6 - GN R326 of the EIA Regulations of 2014 as amended (which came into effect on 7 April 2017).

1.1 SCOPE OF STUDY

The study includes the following activities:

- a description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of environmental issues and potential impacts (including the assessment of direct, indirect and cumulative impacts) that have been identified;
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;
- an indication of the methodology used in determining the significance of potential environmental impacts;
- an assessment of the significance of direct, indirect and cumulative impacts of the development;

- a description and comparative assessment of all alternatives including cumulative impacts;
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the EMPr;
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- a description of any assumptions uncertainties, limitations and gaps in knowledge; and
- an environmental impact statement which contains:
  - a summary of the key findings of the environmental impact assessment;
  - an assessment of the positive and negative implications of the proposed activity; and
  - a comparative assessment of the positive and negative implications of identified alternatives.

General considerations for the study included the following:

- Disclose any gaps in information (and limitations in the study) or assumptions made.
- Identify recommendations for mitigation measures to minimise impacts.
- Outline additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the EMPr for faunal or flora related issues.
- The assessment of the potential impacts of the development and the recommended mitigation measures provided have been separated into the following project phases:
  - Planning and Construction
  - Operation
  - Decommissioning

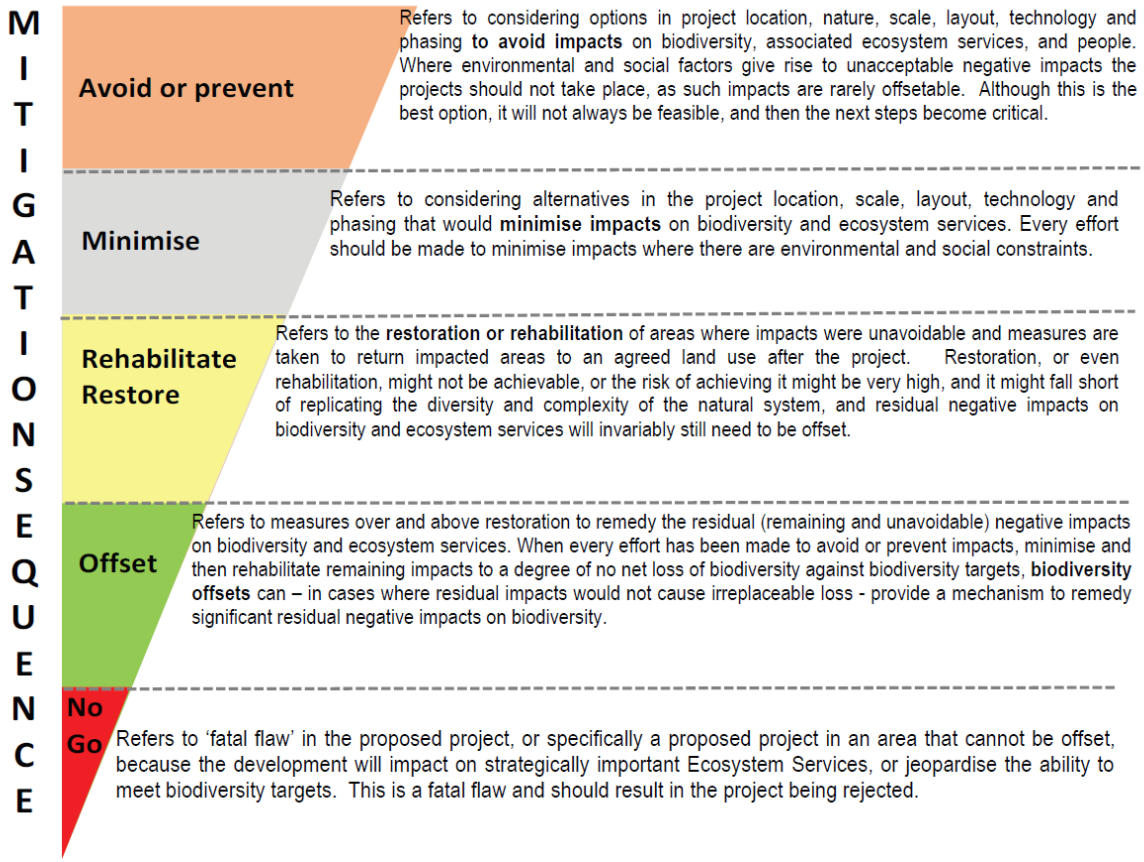
1.1.1. Assessment Approach

This assessment is conducted according to Appendix 6 – GN R326 EIA Regulations, as amended in terms of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA), as well as best-practice guidelines and principles for biodiversity assessments as outlined by Brownlie (2005) and De Villiers *et al*. (2005).

In terms of NEMA, this assessment demonstrates how the proponent intends to comply with the principles contained in Section 2 of NEMA, which amongst other things, indicates that environmental management should:

- (In order of priority) aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity (Figure 1);
- Avoid degradation of the environment;
- Avoid jeopardising ecosystem integrity;

- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.



- **Figure 1.** The mitigation hierarchy that is used to guide the study in terms of the priority of different mitigation and avoidance strategies.

Furthermore, in terms of best practice guidelines as outlined by Brownlie (2005) and De Villiers et al. (2005), a precautionary and risk-averse approach should be adopted for projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (CBAs) (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

- The study includes data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, including:
  - A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of pattern, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighboring types, soils or topography;
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc.*).

Species level

- Species of Conservation Concern (SCC) (giving location if possible using GPS)
- The viability of an estimated population size of the SCC that are present (including the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)
- The likelihood of other RDB species, or SCC, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify SSC and that are known to be:
  - endemic to the region;
  - that are considered to be of conservational concern;
  - that are in commercial trade (CITES listed species); or
  - are of cultural significance.
- Provide monitoring requirements for input into the EMPr for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.

- The extent of alien plant cover on the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified and/or described:

- The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries).
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.2 RELEVANT ASPECTS OF THE DEVELOPMENT

The Boulders Wind Farm is located approximately 14km north of Vredenburg (measured from the centre of the site), within the Western Cape Province (see Figure 2). At this stage it is proposed that the wind farm will have a total contracted capacity of up to 140 MW.

Figure 2. Final layout provided for the current assessment of the Boulders Wind Farm, showing that the development is restricted to the central, southern and eastern parts of the site.

1.3 LIMITATIONS & ASSUMPTIONS

The current study consisted of a site visit as well as a desktop study, in addition to the use of the original Bergwind botanical study for the site which also included a site visit and field assessment. The site visit took place on the 22nd of June 2018. As the vegetation was in a good condition for sampling at the time of the current site visit, there are few limitations with regards to the vegetation sampling. In addition, the site has experienced a high degree of transformation, with the result that the major task of the site visit was to verify and delineate the natural areas from the transformed areas where necessary. Many fauna are difficult to observe in the field and their potential presence at the site must be evaluated based on the literature and available databases. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many areas have not been well sampled with the result that the species lists derived for the area do not always adequately reflect the actual fauna and flora present at the site. In order to reduce the impact of this limitation, and ensure a conservative approach, the species lists derived for the site from the literature and available databases were obtained from an area significantly larger than the study site.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2012 and Powrie 2012 update) as well as the Western Cape Biodiversity Spatial Plan (WCBSP) (2017), where relevant.
- Information on plant and animal species recorded for Quarter Degree Squares (QDS) 3218CC, 3318AA and 3217DD was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably larger area than the project site, but is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past.
- The IUCN conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2018).

Ecosystem:

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).
- Critical Biodiversity Areas were extracted from the 2017 Western Cape Biodiversity Spatial Plan (WCBSP).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases http://vmus.adu.org.za.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT, SANBI (2016) and Skinner and Chimimba (2005) for mammals.

- The faunal species lists provided are based on species which are known to occur in the broad geographical area (QDS 3218CC, 3318AA and 3217DD), as well as an assessment of the habitat in the area based on knowledge of the area from prior work done in the vicinity.

2.2 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the results of the site visit with the available ecological and biodiversity information in the literature and various spatial databases as described above. As a starting point, mapped sensitive features such as wetlands, drainage lines, rocky hills and pans were collated and buffered where appropriate to comply with legislative requirements or ecological considerations. Additional sensitive areas were then identified from the satellite imagery of the site and delineated. All the different layers created were then merged to create a single coverage. Features that were specifically captured in the sensitivity map include drainage features, wetlands and pans, as well as rocky outcrops and intact vegetation remnants. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.
- **Medium** - Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 BROAD-SCALE VEGETATION PATTERNS

The national vegetation types which occur at the site are briefly described below. The common and characteristic species associated with each as described in Mucina & Rutherford (2006) is not repeated here as the actual vegetation as observed at the site is described in Section 3.6.

The national vegetation map (Mucina & Rutherford 2012) for the project site is depicted below in Figure 3. The majority of the site is mapped as falling within the **Saldanha Granite Strandveld** which occurs in the Western Cape Province, on the West Coast, on granite domes from Vredenburg to St Helena Bay and many points along the coast including Paternoster and Saldanha's North Head; also around Langebaan town and at Postberg on the Langebaan Peninsula. According to Mucina & Rutherford (2012), the vegetation consists of low to medium shrubland, containing some succulent elements, alternates with grassy and herb-rich spots supporting a rich geophyte flora.

The Saldanha Granite Strandveld vegetation is listed as Endangered (WCBSP 2017) and out of the original 23 000ha, about 70% has been transformed for cultivation or by urban development. Almost 10% of the vegetation type is statutorily conserved in the West Coast National Park, SAS Saldanha and Columbine Nature Reserves, and a small portion in private reserves such as West Point, Groot Paternoster and Swartriet. The vegetation type has 45 Red Data Book species and 15 endemics. Any intact remnants at the site are considered to be highly sensitive and should be treated as no-go areas.

Saldanha Flats Strandveld occurs to a smaller extent on the western half of the site. This vegetation type is distributed in the Western Cape Province on extensive coastal flats from St Helena Bay and the southern banks of the Great Berg River near its mouth in the north to Saldanha and Langebaan in the south, with the southernmost extension at the coast near Yzerfontein and Rietduin (Mucina & Rutherford 2012). The vegetation consists of sclerophyllous shrublands built of a sparse emergent and moderately tall shrub layer, with an open succulent shrub layer forming the undergrowth and has conspicuous displays of geophytes and annual herbaceous flora in spring (Mucina & Rutherford 2012)..

It is listed as Endangered (uplisted from the 2011 assessemnt of Vulnerable - WCBSP 2017) and some 11% statutorily conserved in the West Coast National Park and Yzerfontein Nature Reserve and a very small portion also in private conservation areas such as Jakkalsfontein and West Point (Mucina & Rutherford 2006). Only 48% of the original extent (76 000ha) remains (DEA 2011). More than half has already been transformed for cultivation, road building or urban development. It has 26 RDB species and at least 2 endemics (DEA 2011). There are no turbines or other wind-farm infrastructure proposed in

the areas where this vegetation type occurs and as such it would not be affected by the development.

Saldanha Limestone Strandveld is distributed in the Western Cape Province over a very limited area with a larger patch on the Kliprug ridge between Saldanha and Paternoster, with several smaller outliers including those between Saldanha and north of Club Mykonos on the Langebaan Lagoon (Mucina & Rutherford 2006). It occurs on slightly undulating ridges and steeper coastal slopes supporting low shrublands built of low succulent-stemmed and deciduous, fleshy leaved shrubs in deeper soils. Patches of prostrate, succulent-leaved dwarf shrubs and annual or geophytic herbs occupy cracks or shallow depressions in the exposed limestone (Mucina & Rutherford 2006).

None of the vegetation type is conserved in statutory conservation areas and only a small fraction protected in the Swartriet Private Nature Reserve. About 40% has been transformed for cultivation or by development of coastal settlements. It is considered to be Least Threatened, but is nevertheless considered vulnerable to further habitat loss due the high existing level of transformation and fragmentation. This vegetation unit does not fall within the development footprint and would not be affected by the development.

Cape Inland Salt Pans occupy the low-lying areas and floodplains of the drainage systems on the site. This azonal vegetation type occurs in the Western and Eastern Cape (to smaller extent) Provinces, from Jakkalsrivier Valley between Graafwater and Lambert's Bay, Rocher Pan and other pans near Dwarskersbos (near Velddrif), Soutpan near Yzerfontein, Rondevlei, Paardevlei, Noordhoek (all near Cape Town), salt vleis of the Agulhas Plain, Zoutpan and several other smaller salt pans in the Albertinia region (Zoutpan, Melkhoutfontein, Vogelvlei). The vegetation occurs in small depressions dominated by low succulent scrub composed of creeping chenopods and salt-tolerant herbs and grasses.

These pans are considered Least Threatened (WCBSP 2017) and 20% is statutorily conserved in the Agulhas and West Coast National Parks as well as in the Soetendalsvlei and Rocherpan Nature Reserves. However, as this ecosystem is associated with hydrological features and plays an important ecological role, it is considered sensitive to disturbance. There are several access roads which traverse these features and although these are along existing road crossings, some additional habitat loss in these areas is likely to occur. Although two turbines in the west are mapped as falling within this vegetation type, this area is transformed and there are not turbines in intact Cape Inland Salt Pans vegetation.

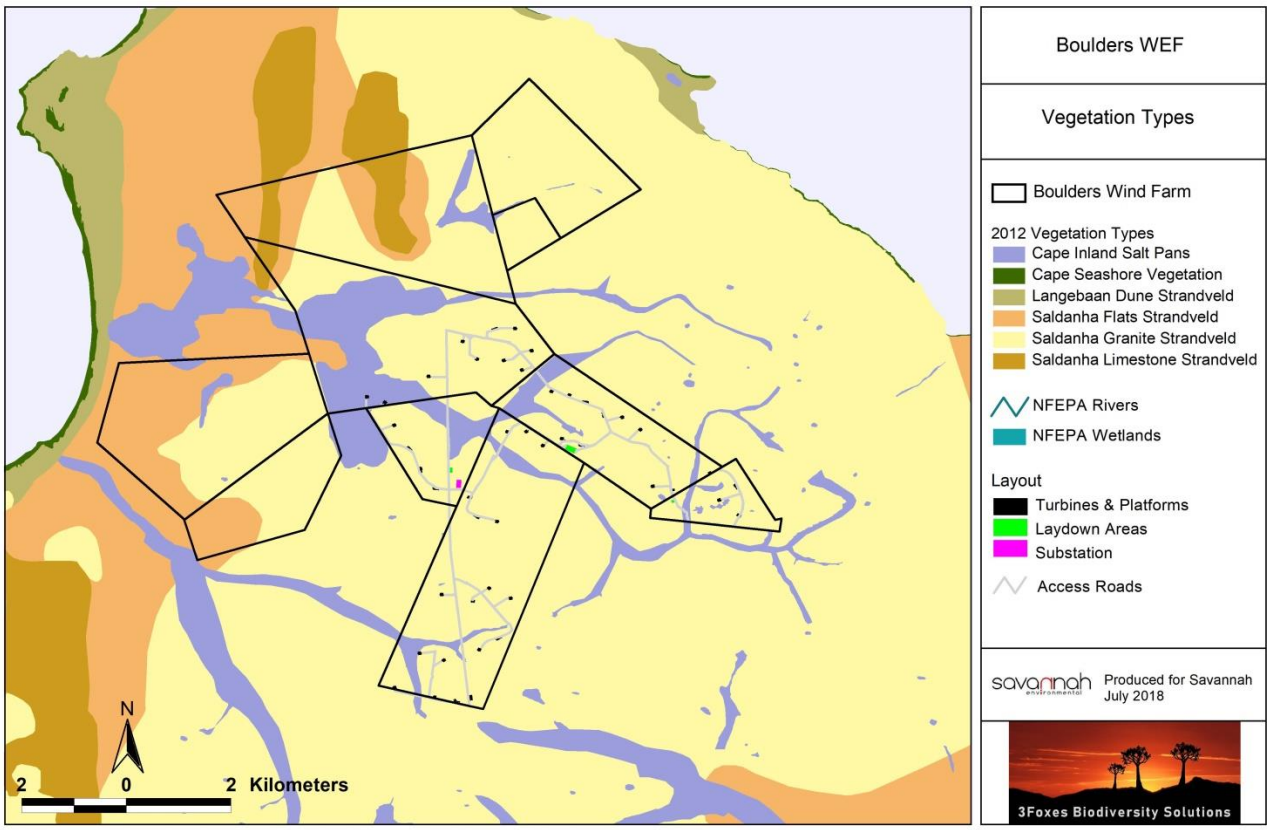


Figure 3. The national vegetation map (Mucina & Rutherford, 2006 & 2012 Powrie update) for the project site. This does not indicate the extensive transformation that has taken place and represents the original vegetation at the site.

Table 1. Habitat condition in the Boulders Wind Farm project site according to the Bergwind (2011) study. These results are confirmed by the independent sensitivity map conducted for the current study.

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description (poor land management practises, presence of quarries, grazing / harvesting regimes etc.)
Natural	5%	Remnant Saldanha Granite Strandveld of variable condition.
Near Natural (includes areas with low to moderate level of alien invasive plants)	5%	Much overgrazing and some invasion by alien plants and disturbance of soil
Degraded (includes area heavily invaded by alien plants)	5%	Limited areas of alien plants and degraded habitats since most areas are cultivated
Transformed (includes cultivation, dams, urban, plantation, roads, etc.)	85%	Most of the arable land has been transformed by ploughing and cultivation

3.2 LISTED PLANT SPECIES

A total of 528 plant species have been recorded from the broader area from Velddrif to Jacobs Bay and inland to Langebaanweg. This includes 5 species that are Critically Endangered, 24 that are Endangered and 36 that are Vulnerable, indicating that a large number of species of special concern are present in the area. Several of these were confirmed present on the site during the site visit and importantly, these occurred in both the larger more intact areas as well as the smaller more degraded fragments. As such, the primary mitigation measure to reduce the impact on species of concern is to avoid impact on the near-natural as well as more intact vegetation fragments. Under the layout assessed, there would be minimal impact on these intact habitats, but some listed species are locally common and occur on roadsides and other areas where there may be a development impact. A preconstruction walk-through of the final development footprint is recommended to ensure that impacts on listed species are kept to a minimum.

Table 1. Summary table of conservation status of plant species known from the broad vicinity of the project site. The full list of species of concern is provided in Annex 1.

IUCN Status	Count
CR	5
EN	25
VU	41
NT	28
DD	6
LC	347
Not Evaluated	127
Grand Total	579

Oxalis suavis (VU) left and *Romulea saldanhensisis* (EN) right were observed in near natural and natural fragments in the western part of the Boulders Wind Farm site.

3.3 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The site lies within the planning domain of the Western Cape Biodiversity Spatial Plan (CapeNature 2017). This biodiversity assessment identifies Critical Biodiversity Areas (CBAs) which represents biodiversity priority areas, and are considered to be areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to maintain ecosystem functioning and meet national biodiversity objectives. There are several CBAs within the wind farm site most of which are in a natural condition and their

proposed objective for use is "*Maintain natural land. Rehabilitate degraded to natural or near natural and manage for no further degradation*" (WCBSP 2017). The Biodiversity Plan also indicates the known presence of plant species of conservation concern within the site, highlighting the potential significance of the intact vegetation fragments. The distribution and functioning of the CBAs are closely associated with the remaining intact areas and provided that the impact on these areas can be minimised then a significant impact on CBAs and their ecological functioning is not likely. Some of the access roads cross areas that are classified as ESAs or CBAs, but these are along existing road alignments and therefore additional habitat loss would be low. As a result, the overall impact of the development on CBAs would be low and the development would not compromise the remaining CBAs of the site.

The site does not lie within a National Protected Area Expansion Strategy (NPAES) focus area and has therefore not been identified as an important area for future conservation area expansion. An Important Bird Area (SA104) for the Berg River Estuary has been identified within 7km of the site. The site also falls within the Cape West Coast Biosphere Reserve, which extends from Milnerton in the south to Laaiplek in the north and as far inland as Malmesbury and Hopefield. There are no core areas within the site, although it is within areas that are buffer areas and transition zones. The buffer areas are natural or transformed areas that generally coincide with the areas mapped as CBAs but are more broadly conceived in some areas, while the transition zones are transformed areas within the greater biosphere reserve which provide for contiguity between the core and buffer areas. As there would be no turbines located within intact vegetation, there would be no additional habitat loss from the development and as such minimal impact on the Biosphere Reserve.

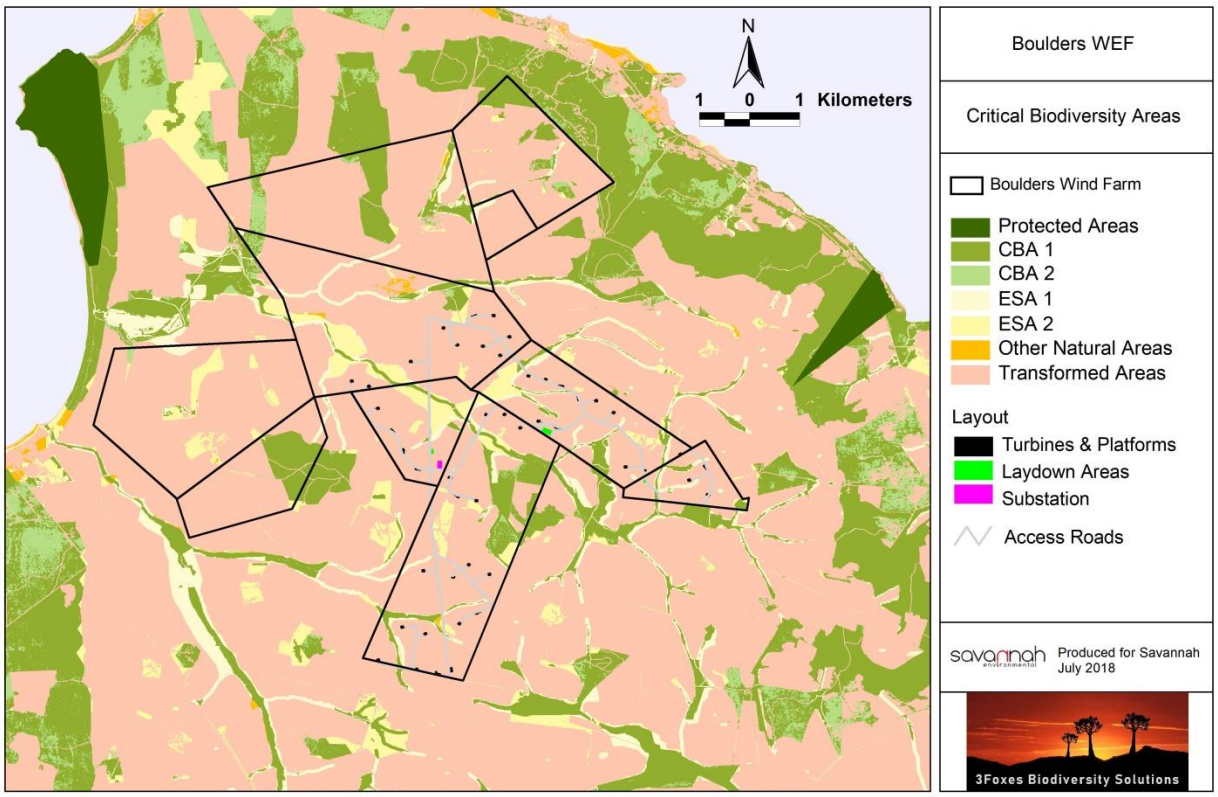


Figure 4. Extract of the Western Cape Biodiversity Spatial Plan (2017) for the project site, showing that while there are several CBAs within the Boulders Wind Farm site, these are of limited extent and correspond with the remaining areas of natural vegetation.

3.4 CUMULATIVE IMPACTS

In terms of existing impacts in the area and the potential for the Boulders Wind Farm to contribute to cumulative impacts, other renewable energy developments in the area are mapped below in Figure 5. The Saldanha—Vredenburg area has lost much of the original vegetation due to agriculture with the result that most of the affected renosterveld vegetation types in the area are listed as threatened ecosystems. As such, additional impact on intact vegetation is highly undesirable and the listed vegetation types of the area are highly vulnerable to cumulative impact. However, the current proposed and adjacent existing 94MW 'West Coast One Windfarm' are located on cultivated agricultural land where there is little remaining natural vegetation. As a result additional loss of vegetation due to the Boulders Wind Farm development can be minimised and there would be Low cumulative impacts on any natural vegetation or fauna due to the wind farms on the Saldanha-Vredenburg Peninsula.

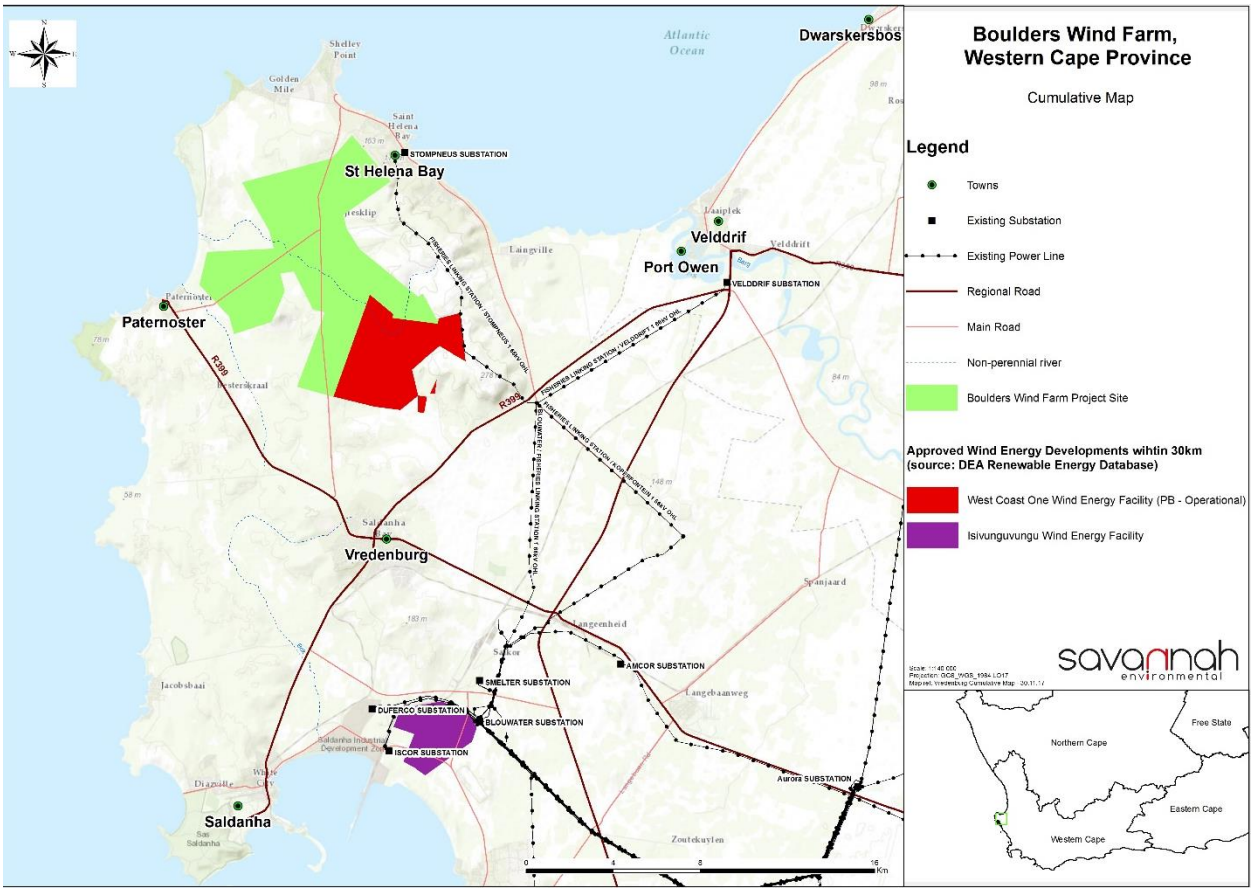


Figure 5. Map illustrating the affected farm portions of known and approved wind energy projects within 30km radius of the Boulders Wind Farm project site (provided by Savannah Environmental).

3.5 FAUNAL COMMUNITIES

Mammals

The site falls within the distribution range of 47 non conservation-dependent terrestrial mammals (Annex 1). Listed mammal species which may occur at the site include the Grant's Golden Mole *Eremitalpa granti granti* (Vulnerable) of which 1 has been recorded in the general area, and Brown Hyaena *Hyaena brunnea* (Near Threatened) and Cape Clawless Otter *Aonyx capensis* (Near Threatened). The Brown Hyeana was likely observed in the West Coast National Park and it is not likely that there any resident individuals in the wind farm project site as it is used for farming and has little cover for a Hyeana. According to the IUCN page for Grant's Golden Mole, it occurs in the Strandveld and Succulent Karoo. It is known to prefer soft, shifting sands of dune crests but is also present in inter-dune swales with quite dense vegetation as long as the sand is not too consolidated. Areas containing scattered clumps of the dune grass (*Aristida sabulicola*), Ostrich Grass (*Cladoraphis spinosa*) and Long Bushman Grass (*Stipagrostis ciliata*), are the preferred habitats for this

species. Based on this description of the preferred habitat, it is highly unlikely that it occurs at the site which has heavy granite-derived soils within the affected areas.

The major impacts on mammals would occur at the construction phase when there would be significant noise and disturbance generated at the site. However, in the long-term, impacts on mammals would be low as additional habitat loss would be minimal and the resident species would be those that are tolerant of human activity and a modified landscape and it is unlikely that any species would be significantly affected by the wind farm development.

Reptiles

The site lies in or near the distribution range of at least 40 reptile species (Annex 2). This is a comparatively low total, suggesting that reptile diversity at the site is likely to be low. There are several listed species which could occur at the site. The Cape Dwarf Chameleon *Bradypodion pumilum* (Vulnerable) would be found in restio clumps often near water, the Large-scaled Girdled Lizard *Cordylus macropholis* (Near Threatened) and the Black Girdled Lizard *Cordylus niger* (Near Threatened) would likely be found on rocky outcrops. However, listed species such as the *C*ape Sand Snake *Psammophis leightoni,* (Vulnerable), Gronovi's Dwarf Burrowing Skink *Scelotes gronovii* (Near Threatened), Kasner's Dwarf Burrowing Skink *Scelotes kasneri* (Near Threatened) and the Bloubergstrand Dwarf Burrowing Skink *Scelotes montispectus* (Near Threatened) are more likely to be located in sandy coastal soils which do not occur within the affected area. The Black Girdled Lizard can be confirmed present at the site and was observed on the large granite outcrops which characterise the site. This habitat will however not be affected by the development and as a result an impact on this or any other species using the rocky areas such as the Ocellated Gecko would not be directly affected by the development.

Where roads occur within intact vegetation they can generate a significant impact on reptiles as they may be vulnerable to predation while crossing such cleared areas. However, the site has already been significantly impacted by transformation with the result that the majority of the site is agricultural croplands unsuitable for most reptiles. The intact vegetation remnants and especially those with rocky outcrops are the most important habitats for reptiles at the site. These would not be affected by the wind farm development with the result that impacts on reptiles are likely to be low.


Common reptiles observed at the Boulders Wind Farm project site include the Occelated Gecko *Pachydactylus geitje* and Black Girdled Lizard *Cordylus niger* which is classified as Near Threatened.

Amphibians

There are eight amphibians known from the area based on the ADU database. The only listed species which may occur in the area is the Cape Caco *Cacosternum capense* (Vulnerable). This species breeds in pans which occur in undulating low-lying areas with poorly drained loamy to clay soils, although it is known from some shallow sandy habitats (IUCN 2017) and therefore it could occur in the inland pan habitat. However, no suitable pans were observed at the site and the lowlands at the site were generally saline and dominated by salt marsh species such as *Sarcocornia*. The only species observed at the site was the Cape River Frog *Amietia fuscigula* which was observed in some rock pools present in one of the rocky outcrops of the site. It is however likely that there are other species which are also using these pools for breeding purposes.

Impacts on amphibians are likely to be low given the transformed nature of the site and the low likely density of amphibians in the area, which are likely to have been impacted by degradation, salinisation and the use of fertilizers and pesticides in the area.

3.6 BOULDERS WIND FARM SITE DESCRIPTION

The main vegetation and habitats present within or near the development footprint are described below, with characteristic and dominant species, features of concern and overall sensitivity of each habitat.

Croplands

The majority of the site is transformed for dryland cereal cropping. There is very little remnant indigenous vegetation within these areas and they are considered to be of a low sensitivity. In terms of fauna, there are few species using these areas due to the ploughing and other cropping activities in these areas. These areas are however used by generalist species such as Steenbok and Bat-eared Foxes which are common in the area. Overall, these areas are however considered to be of a low sensitivity and development in these areas would generate low ecological impacts on fauna and flora. Under the layout assessed, the vast majority of the development footprint is located within this habitat, including the substation site, laydown areas and control buildings.

The majority of the Boulders WEF site consists of transformed croplands considered to be of low ecological sensitivity. The above image illustrates the substation site, which is located within the cropland area in the foreground.

The Boulders WEF site typically consists of large areas of low sensitivity croplands alternating with occasional intact or near-natural fragments of indigenous vegetation and rocky outcrops.

Degraded Strandveld fragments

Many of the remnant fragments of indigenous vegetation at the site are degraded and include a large proportion of alien and weedy species. The diversity of these areas remains quite high and includes bush-clumps of various strandveld species as well as some remnant low shrubland, forbs and geophytes. Common and dominant species include *Searsia glauca*, *Searsia incisa*, *Putterlickia pyracantha*, *Galenia fruticosa*, *Haemanthus coccineus*, *Asparagus capensis*, *Trachyandra falcata*, *Oncosiphon suffruticosus*, *Pteronia divaricata*, *Seriphium plumosum*, *Tylecodon wallichii*, *Aspalathus hispida* subsp. *hispida*, *Calobota cytisoides*, *Romulea saldanhensis* (EN), *Ballota africana*, *Adenogramma teretifolia* (VU), *Oxalis hirta*, *Oxalis suavis* (VU), *Oxalis pes-caprae*, *Oxalis purpurea*, *Lycium ferocissimum*, *Solanum guineense*, *Chenopodium carinatum*, *Cissempelos capensis* and *Erodium cicutarium*. As these are remnants of listed ecosystems, as well as contain the confirmed presence of several listed species as above, they are considered to be of a high sensitivity despite the evident degradation and are considered unsuitable for development.

Although most of the smaller fragments of non-transformed vegetation are highly degraded largely as a result of overgrazing, they were observed to retain significant diversity of fauna and flora. Rocky outcrops such as this remain important habitats for a variety of species of reptiles.

Intact Saldanha Granite Strandveld

There are some larger intact fragments of Saldanha Granite Strandveld present at the site which are considered to be no go areas as these are some of the last remaining, reasonably ecologically functional patches of Saldanha Granite Strandveld in the area. These tend to be moderately-tall shrublands with taller bushclumps or patches in wetter areas or around granite outcrops. As the vegetation cover in the smaller patches has usually been significantly impacted, the larger patches are also especially important for fauna and represent the only refuge areas for many species. Common and dominant species observed in these areas include *Searsia glauca*, *Searsia incisa*, *Oscularia vredenburgensis* (VU), *Ruschia tecta*, *Gnidia geminiflora*, *Passerina filiformis*, *Roepera morgsana*, *Nenax hirta* subsp. *calciphila* (NT), *Lycium ferocissimum*, *Muraltia harveyana* (VU), *Stipagrostis zeyheri*, *Aspalathus hispida* subsp *hispida*, *Calobota cytisoides*, *Tylecodon paniculatus*, *Euclea racemosa* subsp. *racemosa*, *Euphorbia burmannii*, *Pteronia divaricata*, *Seriphium plumosum*, *Maytenus oleoides*, *Pterocelastrus tricuspidatus*, *Putterlickia pyracantha*, *Olea exasperata*, *Eriocephalus racemosus* var. *racemosus*, *Drimia capensis*, *Asparagus declinatus*, *Asparagus capensis*, *Asparagus aethiopicus*, *Asparagus rubicundus* and *Asparagus asparagoides*.

There is a large area of intact Saldanha Granite Strandveld located in the south west of the site. The vegetation in this area is in a fairly good condition and given the high conservation status of Saldanha Granite Strandveld, as well as the generally transformed nature of the site, this area is considered to be of a high sensitivity and unsuitable for development.

Drainage lines

The drainage lines and low-lying areas of the site are fairly degraded, most likely as a result of the dysfunctional nature of the landscape as a result of cropping, fertilizer inputs and overgrazing. Diversity in these areas is generally low as a result of overgrazing, erosion or salinisation. Dominant species include *Sarcocornia* spp. *Atriplex cinerea*, *Lycium cinereum*, *Suaeda inflata*, *Limonium equisetinum* and *Sporobolus virginicus*. As these are hydrological features of the landscape and are also important as corridors for the movement of fauna, they are considered sensitive and should be avoided as much as possible.

Many of the drainage systems of the site are degraded, with evident erosion and lack of vegetation to regulate flow.

The low-lying drainage areas of the site are generally saline in nature and dominated by halophytic *Sarcocornia* and *Salsola* species.

3.7 BOULDERS WIND FARM SENSITIVITY ASSESSMENT

The sensitivity map for the project site is depicted below in Figure 6. The majority of the site is transformed and considered to be of a low sensitivity. Development in these areas would generate very low ecological impacts. This is in strong contrast with the remaining intact areas which are considered to be of a high sensitivity and unsuitable for development. There would however be minimal impact to these areas under the layout assessed. Although many of the smaller fragments are degraded as a result of overgrazing, these belong to vegetation types of high conservation concern and are still considered unsuitable for development as a result. Given that the footprint is restricted largely to low sensitivity areas, the impact on sensitive features at the site would be low.

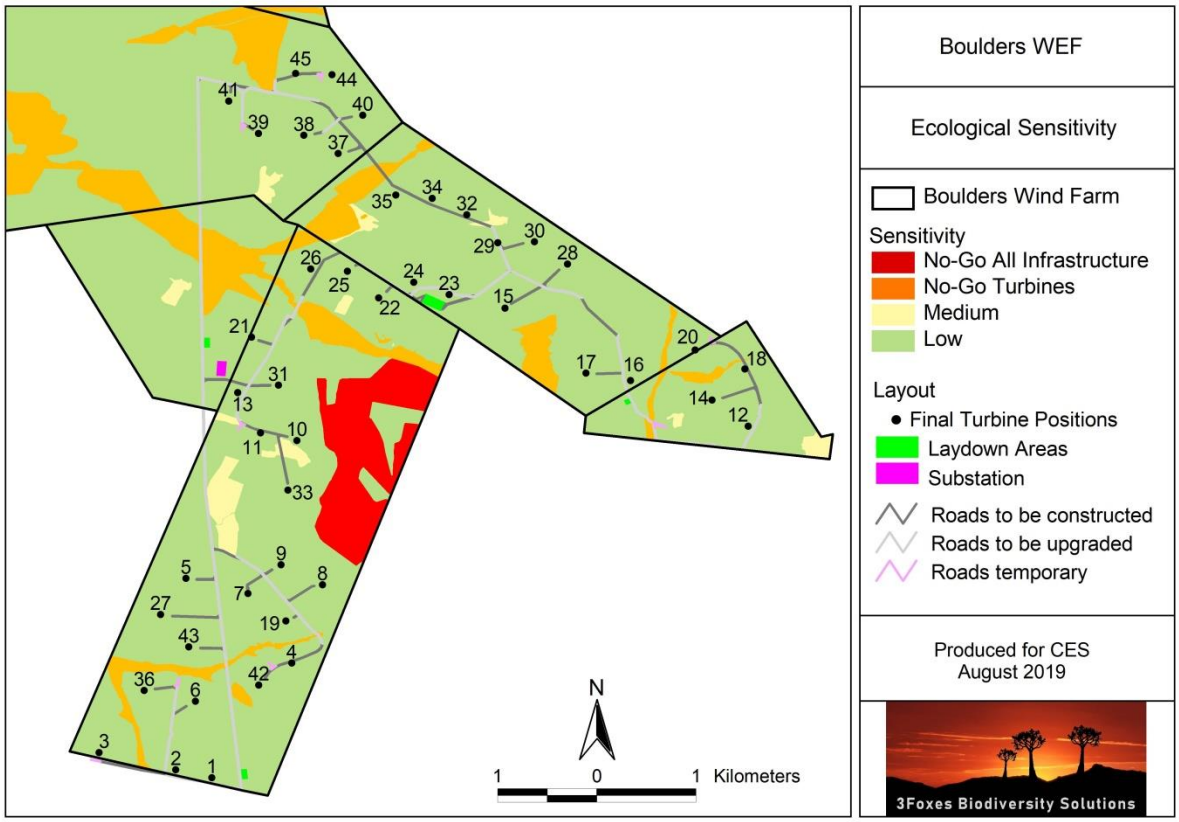


Figure 6. Ecological sensitivity map for the Boulders Wind Farm project site. There are several intact listed vegetation areas, scattered pans, rocky outcrops and drainage lines which are considered sensitive and which should be avoided as much as possible.

4 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Boulders Wind Farm, is likely to result in a variety of impacts, associated largely with construction-phase disturbance. Impacts in the operation phase would be low and long-term impacts on CBAs would also be low as the development footprint is restricted largely to transformed areas where there would be little long-term residual impact. The following impacts are identified as the major impacts that are likely to be associated with the development of the Boulders Wind Farm, for the preconstruction, construction and operation phases of the development. The avoidance that has taken place as part of the layout design is considered to have occurred prior to the assessment and as such is already considered in the pre-mitigation impact. Mitigation is therefore considered to represent activities in addition to the avoidance that has already been implemented.

1. Impacts on vegetation and protected plant species

The development may result in the further transformation and loss of intact vegetation. Although the impact on intact vegetation would be low, some of the existing roads that traverse through the intact areas would likely need to be widened with the result that some minor impact on vegetation and plant species of concern may occur.

2. Direct Faunal impacts

Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna especially during construction. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Chemical spills or waste that enter waterways could negatively impact amphibians. During operation, the turbines would generate noise and movement which may deter some fauna from their vicinity, but most species would be likely to be become habituated in the long-term, especially as most fauna present is likely to be tolerant of human activity.

3. Impacts on Critical Biodiversity Areas and Broad-Scale Ecological Processes.

The development could potentially contribute to cumulative impacts in the area and the ability to meet future conservation targets. However, the footprint of the wind farm is restricted to transformed areas with the result that impact on CBAs and ecological processes would be very low. This is considered to represent an operation-phase impact, although the transformation itself would be generated at construction.

4. Cumulative Impacts.

The development will contribute to cumulative impacts in the area, which has already experienced a high degree of transformation. This is potentially significant if the development would result in further transformation and fragmentation of intact habitat

(including indigenous vegetation). However, under the layout assessed, the development is restricted to transformed and degraded areas, with the result that the contribution to cumulative impact would be low and is not considered to be a significant concern associated with the development.

5 ASSESSMENT & SIGNIFICANCE CRITERIA

Direct, indirect and cumulative impacts of the issues identified in this report are assessed in terms of the following criteria:

- The **nature** which includes a description of what causes the effect what will be affected and how it will be affected.

- The **extent** wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 is assigned as appropriate (with 1 being low and 5 being high):

- The **duration** wherein it is indicated whether:

    - the lifetime of the impact will be of a very short duration (0- 1 years) - assigned a score of 1.
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2.
    - medium-term (5-15 years) - assigned a score of 3
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5

- The **magnitude** quantified on a scale from 0-10 where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way 8 is high (processes are altered to the extent that they temporarily cease) and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** of occurrence, which shall describe the (likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but of low likelihood) , 3 is probable (distinct possibility) , 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

The **significance** which shall be determined through a syntheses of the characteristics

described above and can be assessed as low, medium or high;
and;
the status, which will be described as either positive, negative or neutral.
the degree to which the impact can be reversed.
the degree to which the impact may cause irreplaceable loss of resources.
the degree to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:
S = (E + D + M)P
Where

S = significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The significance weightings for each potential impact are as follows:

- **<30** points: **Low** (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- **30-60** points: **Medium** (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- **>60** points: **High** (i.e. where the impact must have an influence on the decision process to develop in the area).

6 ASSESSMENT OF IMPACTS

An assessment of the likely extent and significance of each impact identified above is made below.

CONSTRUCTION & PLANNING PHASE IMPACTS

Impact 1: Impacts on vegetation due to construction activities

Impact Nature: Impacts on vegetation could occur due to disturbance and vegetation clearing associated with the construction of the facility. Although the footprint largely avoids intact areas, some parts of the development are in close proximity to intact areas and some impact could potentially occur.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (27)	Low (14)
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Low	Low
Can impacts be mitigated?	Provided that the intact remnants are avoided, then any potential impacts are likely to be easily mitigated.	
Mitigation	• No infrastructure such as new roads should traverse intact strandveld patches. Where there are existing roads through these areas, these are likely to be acceptable, but should be confirmed as not impacting any species of concern during the preconstruction walk-through of the facility. • The final layout including roads and underground cables should be subject to a preconstruction walk-through before construction commences and adjusted where required. • All intact fragments should be considered no-go areas for vehicles as well as personnel during construction. • All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving is to be allowed. • Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity (as is currently the case for the assessed layout).	
Cumulative Impacts	Provided that the intact remnants are avoided, cumulative impacts would be very low.	
Residual Risks	Provided that the intact patches are avoided, there should be no residual impacts.	

Impact 2. Faunal impacts due to construction activities.

Impact Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, faunal disturbance will extend well beyond the footprint and extend into adjacent intact areas, even though there will be no direct habitat loss in these areas. This will be transient and restricted to the construction phase.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly Probable (4)	Probable (3)
Significance	Low (28)	Low (15)
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Although the large amounts of noise and disturbance generated at the site during construction is largely unavoidable, impacts such as those resulting from the presence of construction personnel at the site can be easily mitigated.	
Mitigation	• Site access should be controlled and no unauthorised persons should be allowed onto the site. • All intact strandveld patches should be considered no-go areas for vehicles and personnel. • Any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site. • Fires should not be allowed on site. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • All construction vehicles should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises. • If any parts of the facility are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but	

	rather adopt defensive behaviour and are killed by repeated shocks.
Cumulative Impacts	During the construction phase the activity would contribute to cumulative fauna disturbance and disruption in the area, but given the highly transformed nature of the site, this would be low.
Residual Risks	Provided that the intact fragments can be avoided, then there would be little residual impact for fauna from construction activities, although the operation of the facility would generate some impact.

OPERATION PHASE IMPACTS

Impact 1. Faunal Impacts due to operation

Impact Nature: The operation and presence of the facility may lead to disturbance or persecution of fauna within or adjacent to the facility.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low to Minor (3)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To a large extent, but some low-level residual impact due to turbine noise and human disturbance is likely.	
Mitigation	• No unauthorised persons should be allowed onto the site. • Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. • The collection, hunting or harvesting of any plants or animals at the site or in the surrounding areas should be strictly forbidden. • If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	

	• All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
Cumulative Impacts	The development would contribute to cumulative habitat loss for fauna, but the contribution would be very small and is not considered significant.
Residual Risks	As the intact habitats at the site will not be significantly affected, residual risks on fauna would be very low.

Impact 2. Negative impact on CBAs and broad-scale ecological processes.

Impact Nature: Development of the wind farm may impact CBAs and broad-scale ecological processes such as the ability of fauna to disperse between strandveld patches.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (24)	Low (14)
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, the major mitigation measure is to ensure that no intact habitat is lost and this has been achieved under the layouts assessed.	
Mitigation	• An open space management plan should be developed for the site, which should include management of biodiversity within the affected areas, as well as that in the adjacent intact strandveld.	
Cumulative Impacts	The development would potentially contribute to habitat degradation and the loss of landscape connectivity and ecosystem function within the adjacent intact strandveld patches, but this is not likely to be significant as it is not likely that there are any species present that would be sensitive to the presence of the turbines.	
Residual Risks	The presence of the facility will potentially generate some impact but this is likely to be very low as the ecological integrity of the area has already been significantly compromised and the additional impact of the windfarm is low.	

Impact 3. Cumulative impacts.

Nature: The development of the Boulders Wind Farm will potentially contribute to cumulative habitat loss and other cumulative impacts in the greater Vredenburg peninsula area.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor(2)	Minor-Low (3)
Probability	Improbable (2)	Probable (3)
Significance	Low (14)	Low (24)
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Low	Low
Can impacts be mitigated	Yes, to a large degree, but through direct avoidance with little other avenue for mitigation.	
Mitigation: • Avoid any further habitat loss and degradation of any intact vegetation fragments. • Promote sustainable land use practices in the area and especially on wind farm properties to improve the quality of the habitat for fauna and flora. Reducing grazing pressure on intact remnants is identified as a particularly important mitigation measure to improve habitat quality. • Ensure that alien species of flora as well as fauna are managed to ensure that they do not have a broadly negative impact.		

7 COMPARATIVE ASSESSMENT OF WIND FARM ALTERNATIVES

In response to various sensitivities and concerns regarding the layout of the Boulders Wind Farm, the developer has provided a final mitigated layout for comparison with the assessed layout. The two layouts are illustrated below in Figure 7 and Figure 8 below, overlaid on the ecological sensitivity map of the site. The majority of the turbines are in the same position, but the node of seven turbines north-west of the main public road have been redistributed further south or east of the road. As with the original layout, all of the turbines are within transformed habitat. In terms of ecological impacts, these changes are not considered substantial and the major effect would be to consolidate the wind farm development to within a somewhat smaller area. The change is seen as being somewhat positive for fauna, as the node of turbines relocated away from the northwest of the site would not be present

and that area would become free of operational phase disturbance and experience a reduction in turbine noise. However, this would not be sufficient to result in an overall reduction in faunal impact associated with the development and the assessed impact on fauna would still be similar to the original layout. In terms of impacts on vegetation, the new turbine positions are restricted to transformed habitat and the change would not result in any changes to habitat loss or impact on plant SCC. Furthermore, in terms of cumulative impact, the changes are considered to have negligible impact and the assessed impacts are considered equally applicable to the new layout. As no new habitats or other features would be impacted by the revised layout, no additional mitigation of avoidance is recommended and the original mitigation and avoidance measures are also considered applicable to the final revised layout.

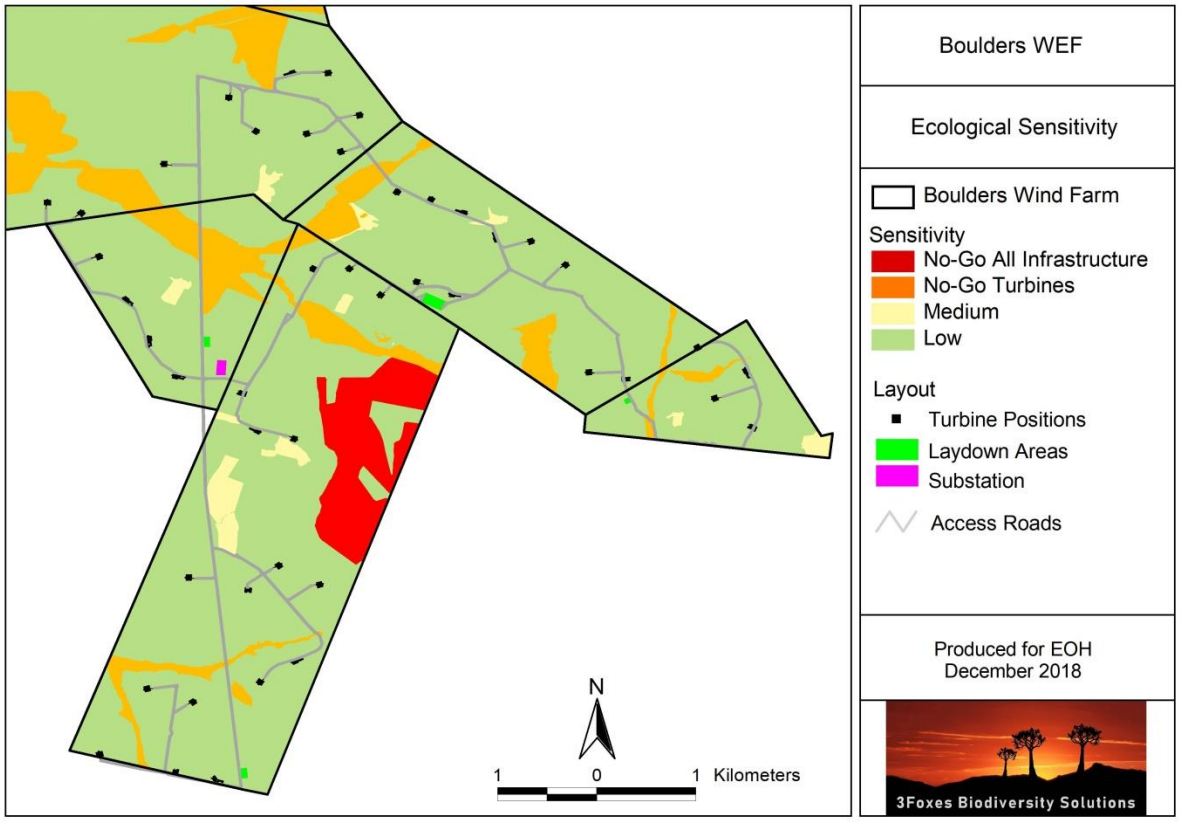


Figure 7. Sensitivity map of the Boulders Wind Farm development, showing the assessed layout of the development.

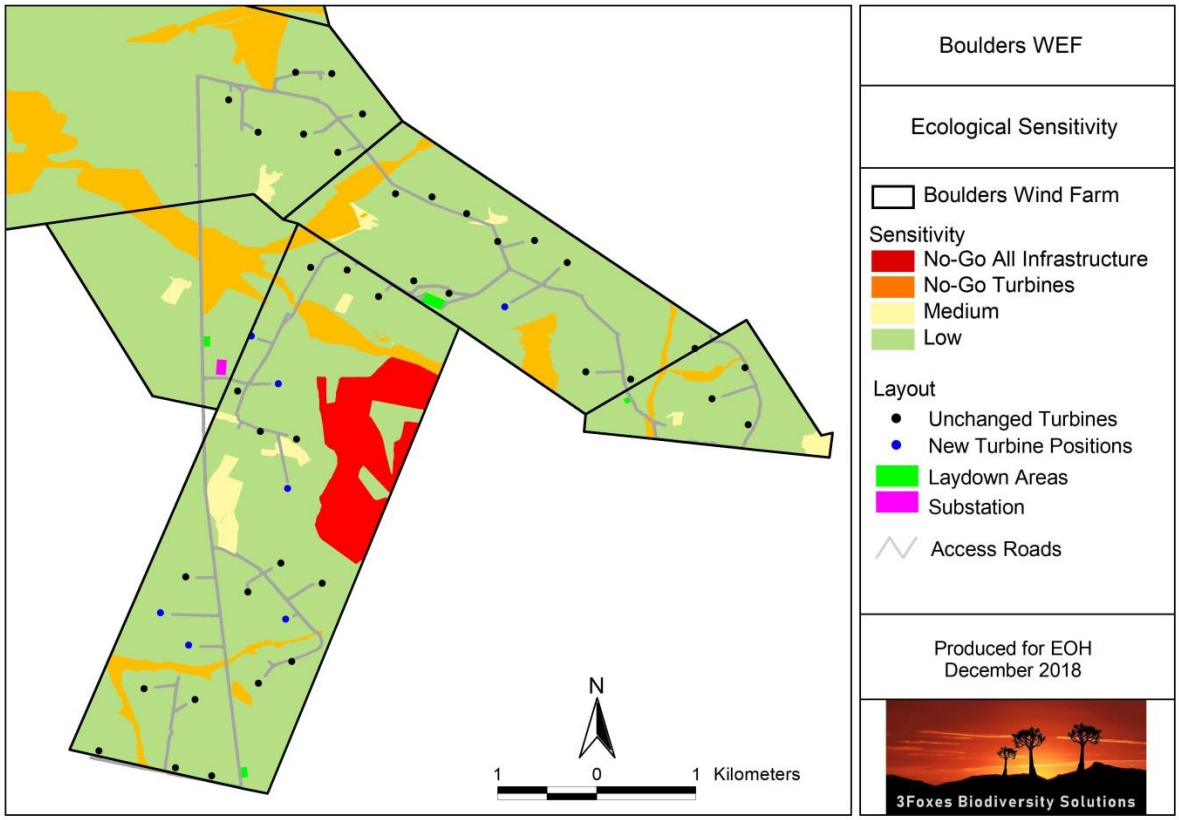


Figure 8. Sensitivity map of the Boulders Wind Farm development, showing the revised layout of the development and the position of the adjusted turbines.

8 CONCLUSION & RECOMMENDATIONS

Although the majority of the site is of low sensitivity and presents an opportunity for the development of the wind farm, there are also some very high sensitivity ecosystems present at the site which are considered to represent no-go areas from a development perspective. This includes numerous small, generally degraded fragments as well as larger more ecologically intact remnants of natural vegetation. Numerous species of conservation concern were confirmed present in these areas, even in the smaller degraded areas. More than 100 listed species are known from the broader area and as the intact fragments are also from listed vegetation types, these areas are not considered suitable for development. Under the layout alternatives assessed, there are no turbines or access roads through the high sensitivity areas and these have been well avoided by the development. Cumulative impacts as well as impacts on CBAs as a result of the development are likely to be low as the footprint of the development would be largely restricted to already transformed areas and operational impacts on terrestrial ecology within such areas would be very low.

The final revised layout is considered to have similar ecological impacts to the original layout and no additional mitigation or avoidance recommendations are associated with the changes to the layout. The assessed impacts for the original layout are considered applicable to the revised layout and the changes to the layout are not considered substantial and would not result in any changes to the ecological impacts associated with the development.

Ecological Impact Statement:

Due to the avoidance measures that have been implemented in terms of the final revised layout that has been assessed in this Ecological Impact Assessment, the impact of the Boulders Wind Farm has been reduced to a low overall level. There are no specific long-term impacts likely to be associated with the wind farm that cannot be reduced to an acceptable level through mitigation and avoidance. As the development is almost entirely restricted to transformed habitats, the contribution of the development to cumulative impacts would be low and is considered acceptable. As such, there are no high residual impacts or fatal flaws associated with the development and it can be well-supported from a terrestrial ecology perspective. It is therefore the reasoned opinion of the specialist that the Boulders Wind Farm should be authorised, subject to the implementation of the recommended mitigation measures.

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10 ANNEX 1. PLANT SPECIES OF CONSERVATION CONCERN

List of plant species of conservation concern known from the broader area around the Boulders Wind Farm.

Family	Genus	Species	Subspecies	IUCN
Aizoaceae	*Antimima*	*aristulata*		VU
Aizoaceae	*Cephalophyllum*	*rostellum*		EN
Aizoaceae	*Cheiridopsis*	*rostrata*		VU
Aizoaceae	*Drosanthemum*	*calycinum*		NT
Aizoaceae	*Drosanthemum*	*marinum*		NT
Aizoaceae	*Lampranthus*	*amoenus*		EN
Aizoaceae	*Lampranthus*	*glaucus*		VU
Aizoaceae	*Lampranthus*	*scaber*		EN
Aizoaceae	*Lampranthus*	*vernalis*		NT
Aizoaceae	*Oscularia*	*vredenburgensis*		VU
Aizoaceae	*Ruschia*	*cupulata*		EN
Aizoaceae	*Ruschia*	*langebaanensis*		VU
Amaryllidaceae	*Hessea*	*mathewsii*		CR
Amaryllidaceae	*Strumaria*	*chaplinii*		EN
Apiaceae	*Annesorhiza*	*calcicola*		VU
Apiaceae	*Arctopus*	*dregei*		NT
Apiaceae	*Capnophyllum*	*africanum*		NT
Apiaceae	*Glia*	*decidua*		NT
Asphodelaceae	*Aloe*	*framesii*		NT
Asphodelaceae	*Bulbine*	*melanovaginata*		VU
Asteraceae	*Cineraria*	*angulosa*		EN
Asteraceae	*Cotula*	*duckittiae*		VU
Asteraceae	*Cotula*	*filifolia*		NT
Asteraceae	*Cotula*	*pusilla*		VU
Asteraceae	*Felicia*	*elongata*		VU
Asteraceae	*Helichrysum*	*bachmannii*		VU
Asteraceae	*Helichrysum*	*cochleariforme*		NT
Asteraceae	*Helichrysum*	*tricostatum*		NT
Asteraceae	*Osteospermum*	*calcicola*		VU
Asteraceae	*Steirodiscus*	*tagetes*		VU
Boraginaceae	*Echiostachys*	*spicatus*		EN
Caryophyllaceae	*Silene*	*rigens*		NT
Fabaceae	*Argyrolobium*	*velutinum*		VU
Fabaceae	*Aspalathus*	*glabrata*		CR
Fabaceae	*Aspalathus*	*lotoides*	*lagopus*	VU
Fabaceae	*Aspalathus*	*lotoides*	*lotoides*	VU
Fabaceae	*Aspalathus*	*stricticlada*		EN

Fabaceae	*Aspalathus*	*ternata*		NT
Fabaceae	*Indigofera*	*platypoda*		EN
Fabaceae	*Otholobium*	*venustum*		VU
Fabaceae	*Podalyria*	*sericea*		VU
Fabaceae	*Psoralea*	*repens*		NT
Fabaceae	*Wiborgia*	*fusca*	*macrocarpa*	EN
Geraniaceae	*Pelargonium*	*sabulosum*		EN
Hyacinthaceae	*Daubenya*	*zeyheri*		VU
Hypoxidaceae	*Empodium*	*veratrifolium*		EN
Hypoxidaceae	*Pauridia*	*alba*		VU
Hypoxidaceae	*Pauridia*	*linearis*		VU
Hypoxidaceae	*Pauridia*	*longituba*		EN
Hypoxidaceae	*Pauridia*	*minuta*		NT
Iridaceae	*Babiana*	*angustifolia*		NT
Iridaceae	*Babiana*	*hirsuta*		NT
Iridaceae	*Babiana*	*nana*	*nana*	EN
Iridaceae	*Babiana*	*tubulosa*		NT
Iridaceae	*Ferraria*	*densepunctulata*		VU
Iridaceae	*Ferraria*	*foliosa*		NT
Iridaceae	*Ferraria*	*parva*		EN
Iridaceae	*Freesia*	*viridis*	*viridis*	NT
Iridaceae	*Geissorhiza*	*lewisiae*		VU
Iridaceae	*Geissorhiza*	*monanthos*		EN
Iridaceae	*Gladiolus*	*caeruleus*		NT
Iridaceae	*Gladiolus*	*griseus*		CR
Iridaceae	*Gladiolus*	*jonquilliodorus*		EN
Iridaceae	*Hesperantha*	*erecta*		NT
Iridaceae	*Hesperantha*	*saldanhae*		CR
Iridaceae	*Ixia*	*purpureorosea*		VU
Iridaceae	*Moraea*	*calcicola*		EN
Iridaceae	*Moraea*	*hainebachiana*		VU
Iridaceae	*Moraea*	*saldanhensis*		CR
Iridaceae	*Romulea*	*barkerae*		EN
Iridaceae	*Romulea*	*elliptica*		EN
Iridaceae	*Romulea*	*saldanhensis*		EN
Malvaceae	*Anisodontea*	*biflora*		VU
Malvaceae	*Hermannia*	*procumbens*	*myrrhifolia*	EN
Malvaceae	*Hermannia*	*rugosa*		VU
Molluginaceae	*Adenogramma*	*teretifolia*		VU
Oxalidaceae	*Oxalis*	*burtoniae*		VU
Oxalidaceae	*Oxalis*	*suavis*		VU
Plumbaginaceae	*Limonium*	*acuminatum*		VU
Plumbaginaceae	*Limonium*	*capense*		NT
Plumbaginaceae	*Limonium*	*purpuratum*		EN

Poaceae	*Tribolium*	*ciliare*		VU
Polygalaceae	*Muraltia*	*harveyana*		VU
Polygalaceae	*Muraltia*	*macropetala*		VU
Polygalaceae	*Muraltia*	*obovata*		VU
Proteaceae	*Leucadendron*	*cinereum*		VU
Proteaceae	*Leucadendron*	*foedum*		VU
Proteaceae	*Serruria*	*decipiens*		VU
Rubiaceae	*Nenax*	*hirta*	*calciphila*	NT
Rutaceae	*Agathosma*	*thymifolia*		VU
Rutaceae	*Diosma*	*aspalathoides*		NT
Rutaceae	*Diosma*	*guthriei*		NT
Rutaceae	*Macrostylis*	*crassifolia*		VU
Scrophulariaceae	*Manulea*	*augei*		EN
Scrophulariaceae	*Manulea*	*corymbosa*		VU
Scrophulariaceae	*Phyllopodium*	*capillare*		NT
Scrophulariaceae	*Selago*	*inaequifolia*		EN
Scrophulariaceae	*Zaluzianskya*	*parviflora*		NT
Thymelaeaceae	*Passerina*	*filiformis*	*glutinosa*	NT

11 ANNEX 2. LIST OF MAMMALS

List of mammals which are likely to occur in the broad vicinity of the Boulders WEF study area. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2016.

Family	Genus	Species	Common name	Red list category
Bathyergidae	*Bathyergus*	*suillus*	Cape Dune Mole-rat	Least Concern
Bathyergidae	*Cryptomys*	*hottentotus*	Southern African Mole-rat	Least Concern
Bathyergidae	*Georychus*	*capensis*	Cape Mole-rat	Least Concern
Bovidae	*Raphicerus*	*campestris*	Steenbok	Least Concern
Bovidae	*Raphicerus*	*melanotis*	Cape Grysbok	Least Concern
Bovidae	*Sylvicapra*	*grimmia*	Bush Duiker	Least Concern
Canidae	*Canis*	*mesomelas*	Black-backed Jackal	Least Concern
Canidae	*Otocyon*	*megalotis*	Bat-eared Fox	Least Concern
Canidae	*Vulpes*	*chama*	Cape Fox	Least Concern
Cercopithecidae	*Papio*	*ursinus*	Chacma Baboon	Least Concern
Chrysochloridae	*Chrysochloris*	*asiatica*	Cape Golden Mole	Data Deficient
Chrysochloridae	*Eremitalpa*	*granti*	Grant's Golden Mole	Vulnerable
Felidae	*Caracal*	*caracal*	Caracal	Least Concern
Herpestidae	*Atilax*	*paludinosus*	Marsh Mongoose	Least Concern
Herpestidae	*Cynictis*	*penicillata*	Yellow Mongoose	Least Concern
Herpestidae	*Herpestes*	*ichneumon*	Egyptian Mongoose	Least Concern
Herpestidae	*Herpestes*	*pulverulentus*	Cape Gray Mongoose	Least Concern
Hyaenidae	*Hyaena*	*brunnea*	Brown Hyena	Near Threatened
Hystricidae	*Hystrix*	*africaeaustralis*	Cape Porcupine	Least Concern
Leporidae	*Lepus*	*capensis*	Cape Hare	Least Concern
Macroscelididae	*Elephantulus*	*edwardii*	Cape Elephant Shrew	Least Concern
Molossidae	*Tadarida*	*aegyptiaca*	Egyptian Free-tailed Bat	Least Concern
Muridae	*Aethomys*	*granti*	Grant's Rock Mouse	Least Concern
Muridae	*Aethomys*	*namaquensis*	Namaqua Rock Mouse	Least Concern
Muridae	*Desmodillus*	*auricularis*	Cape Short-tailed Gerbil	Least Concern
Muridae	*Gerbilliscus*	*afra*	Cape Gerbil	Least Concern
Muridae	*Gerbilliscus*	*paeba*	Paeba Hairy-footed Gerbil	Least Concern
Muridae	*Gerbilliscus*	*vallinus*	Brush-tailed Hairy-footed Gerbil	Least Concern
Muridae	*Mus*	*minutoides*	Southern African Pygmy Mouse	Least Concern
Muridae	*Myomyscus*	*verreauxi*	Verreaux's Mouse	Least Concern
Muridae	*Myotomys*	*unisulcatus*	Bush Karroo Rat	Not listed
Muridae	*Otomys*	*irroratus*	Southern African Vlei Rat	Least Concern
Muridae	*Otomys*	*saundersiae*	Saunders' Vlei Rat	Least Concern
Muridae	*Otomys*	*unisulcatus*	Karoo Bush Rat	Least Concern
Muridae	*Parotomys*	*brantsii*	Brants's Whistling Rat	Least Concern
Muridae	*Rhabdomys*	*pumilio*	Xeric Four-striped Grass Rat	Least Concern

Family	Genus	Species	Common name	Red list category
Mustelidae	*Aonyx*	*capensis*	African Clawless Otter	Least Concern
Mustelidae	*Ictonyx*	*striatus*	Striped Polecat	Least Concern
Mustelidae	*Mellivora*	*capensis*	Honey Badger	Near Threatened
Nesomyidae	*Dendromus*	*melanotis*	Gray African Climbing Mouse	Least Concern
Nycteridae	*Nycteris*	*thebaica*	Egyptian Slit-faced Bat	Least Concern
Orycteropodidae	*Orycteropus*	*afer*	Aardvark	Least Concern
Procaviidae	*Procavia*	*capensis*	Rock Hyrax	Least Concern
Rhinolophidae	*Rhinolophus*		Horseshoe Bats	Not listed
Rhinolophidae	*Rhinolophus*	*capensis*	Cape Horseshoe Bat	Near Threatened
Rhinolophidae	*Rhinolophus*	*clivosus*	Geoffroy's Horseshoe Bat	Near Threatened
Soricidae	*Crocidura*	*cyanea*	Reddish-gray Musk Shrew	Data Deficient
Soricidae	*Crocidura*	*flavescens*	Greater Red Musk Shrew	Data Deficient
Soricidae	*Myosorex*	*varius*	Forest Shrew	Data Deficient
Soricidae	*Suncus*	*varilla*	Lesser Dwarf Shrew	Data Deficient
Vespertilionidae	*Eptesicus*	*hottentotus*	Long-tailed Serotine	Least Concern
Vespertilionidae	*Miniopterus*	*natalensis*	Natal Long-fingered Bat	Not listed
Vespertilionidae	*Neoromicia*	*capensis*	Cape Serotine	Least Concern
Viverridae	*Genetta*	*genetta*	Common Genet	Least Concern
Viverridae	*Genetta*	*tigrina*	Cape Genet	Least Concern

12 ANNEX 3. LIST OF REPTILES

List of reptiles which are likely to occur in the broad vicinity of the Boulders WEF site, based on records from the SARCA database, conservation status is from Bates et al. 2013.

Family	Genus	Species	Subspecies	Common name	Red list category
Agamidae	*Agama*	*hispida*		Spiny Ground Agama	Least Concern
Chamaeleonidae	*Bradypodion*	*occidentale*		Western Dwarf Chameleon	Least Concern
Chamaeleonidae	*Bradypodion*	*pumilum*		Cape Dwarf Chameleon	Vulnerable
Colubridae	*Crotaphopeltis*	*hotamboeia*		Red-lipped Snake	Least Concern
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern
Colubridae	*Dispholidus*	*typus*	*typus*	Boomslang	Least Concern
Cordylidae	*Chamaesaura*	*anguina*	*anguina*	Cape Grass Lizard	Least Concern
Cordylidae	*Cordylus*	*cordylus*		Cape Girdled Lizard	Least Concern
Cordylidae	*Cordylus*	*macropholis*		Large-scaled Girdled Lizard	Near Threatened
Cordylidae	*Cordylus*	*niger*		Black Girdled Lizard	Near Threatened
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Least Concern
Elapidae	*Naja*	*nivea*		Cape Cobra	Least Concern
Gekkonidae	*Afrogecko*	*porphyreus*		Marbled Leaf-toed Gecko	Least Concern
Gekkonidae	*Goggia*	*lineata*		Northern Striped Pygmy Gecko	Least Concern
Gekkonidae	*Pachydactylus*	*austeni*		Austen's Gecko	Least Concern
Gekkonidae	*Pachydactylus*	*geitje*		Ocellated Gecko	Least Concern
Lacertidae	*Meroles*	*knoxii*		Knox's Desert Lizard	Least Concern
Lacertidae	*Pedioplanis*	*lineoocellata*	*pulchella*	Common Sand Lizard	Least Concern
Lamprophiidae	*Duberria*	*lutrix*	*lutrix*	South African Slug-eater	Least Concern
Lamprophiidae	*Homoroselaps*	*lacteus*		Spotted Harlequin Snake	Least Concern
Lamprophiidae	*Lamprophis*	*aurora*		Aurora House Snake	Least Concern
Lamprophiidae	*Psammophis*	*crucifer*		Cross-marked Grass Snake	Least Concern
Lamprophiidae	*Psammophis*	*leightoni*		Cape Sand Snake	Vulnerable
Lamprophiidae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern
Lamprophiidae	*Psammophylax*	*rhombeatus*	*rhombeatus*	Spotted Grass Snake	Least Concern
Lamprophiidae	*Pseudaspis*	*cana*		Mole Snake	Least Concern
Leptotyphlopidae	*Leptotyphlops*	*nigricans*		Black Thread Snake	Least Concern
Scincidae	*Acontias*	*grayi*		Gray's Dwarf Legless Skink	Least Concern
Scincidae	*Acontias*	*meleagris*		Cape Legless Skink	Least Concern
Scincidae	*Scelotes*	*bipes*		Silvery Dwarf Burrowing Skink	Least Concern
Scincidae	*Scelotes*	*gronovii*		Gronovi's Dwarf Burrowing Skink	Near Threatened
Scincidae	*Scelotes*	*kasneri*		Kasner's Dwarf Burrowing Skink	Near Threatened
Scincidae	*Scelotes*	*montispectus*		Bloubergstrand Dwarf Burrowing Skink	Near Threatened
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Least Concern

Family	Genus	Species	Subspecies	Common name	Red list category
Scincidae	*Trachylepis*	*homalocephala*		Red-sided Skink	Least Concern
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern
Scincidae	*Typhlosaurus*	*caecus*		Southern Blind Legless Skink	Least Concern
Testudinidae	*Chersina*	*angulata*		Angulate Tortoise	Least Concern
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern

13 ANNEX 4. LIST OF AMPHIBIANS

List of amphibians which are likely to occur in in the broad vicinity of the Boulders WEF site. Habitat notes and distribution records are based on Du Preez and Carruthers (2009), while conservation status is from the Minter et al. 2004.

Scientific Name	Common Name	Status	Likelihood
Breviceps namaquensis	Namaqua Rain Frog	Least Concern	High
Breviceps rosei	Sand Rain Frog	Least Concern	High
Vandijkophrynus angusticeps	Sand Toad	Least Concern	High
Xenopus laevis	Common Platanna	Least Concern	Low
Amietia fuscigula	Cape River Frog	Least Concern	Confirmed
Cacosternum capense	Cape Caco	Vulnerable	Moderate
Strongylopus grayii	Clicking Stream Frog	Least Concern	Low
Tomopterna delalandii	Cape Sand Frog	Least Concern	Moderate

14 ANNEX 5. PLANT RESCUE AND PROTECTION PLAN

Management Plan Objectives

The purpose of the Boulders WEF plant rescue and protection plan is to implement avoidance and mitigation measures to reduce the impact of the development of the Boulders Wind Energy Facility on listed and protected plant species and their habitats during construction and operation.

Identification of Species of Conservation Concern

Plant species are protected at the national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, protected trees are listed by DAFF under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DAFF. At the provincial level, all species of concern under the Red List of South African plants (http://redlist.sanbi.org/) as well as species listed under the Western Cape Nature Conservation Laws Amendment Act (2000) are protected and require provincial permits. The *Western Cape Nature Conservation Laws Amendment Act* provides lists of protected species of plant and animals and in some cases whole plant genera or families may be listed as protected. Of particular relevance are the following, which highlights the plant genera and families most likely to be encountered at the site, but is not intended to be a comprehensive list.

Schedule 4 Protected Flora:

- *Amaryllidaceae* – All species
- *Lachenalia* – All Species
- *Iridaceae* – All Species
- *Mesembryanthemaceae* – All species
- *Orchidaceae* – All species
- *Diascia* – All species

Mitigation & Avoidance Options

The primary mitigation and avoidance measure that must be implemented at the preconstruction phase is the Preconstruction Walk-Through of the development footprint. This defines which and how many individuals of listed and protected species are found within the development footprint. This information is required for the DAFF and Western Cape permits which must be obtained before construction can commence. A DAFF permit is however only required where nationally protected trees are within the development footprint and would be impacted.

Where listed plant species fall within the development footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the development footprint. However, not all species are suitable for translocation as only certain types of plants are able to survive the disturbance. Suitable candidates for translocation include most geophytes and succulents. Although there are exceptions, the majority of woody species do not survive translocation well and it is generally not recommended to try and attempt to translocate such species. Recommendations in this regard would be made following the walk-through of the facility footprint before construction, where all listed and protected species within the development footprint will be identified and located.

Rescue and Protection Plan

Preconstruction

- Identification of all listed species which may occur within the site, based on the SANBI SIBIS database as well as the specialist EIA studies for the site and any other relevant literature.

Before construction commences at the site, the following actions should be taken:

- A walk-through of the final development footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the development footprint. This would need to happen during the peak flowering season at the site which depending on rainfall is likely to be during spring (August to September).

- A walk-through report following the walk-through which identifies areas where minor deviations to roads and other infrastructure can be made to avoid sensitive areas and important populations of listed species. The report should also contain a full list of localities where listed species occur within the development footprint and the number of affected individuals in each instance, so that this information can be used to comply with the permit conditions required by the authorization as well as provincial requirements.

- Search and rescue operation of all listed species suitable for translocation within the development footprint that cannot be avoided. Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes. Those species suitable for search as rescue should be identified in the walk-through report. It is important to note that a permit is required to translocate or destroy any listed and protected species even if they do not leave the property.

Construction Phase

- ECO to monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the ECO and any listed species present which are able to survive translocation should be translocated to a safe site.

- Any listed species observed within the development footprint that were missed during the preconstruction plant sweeps should be translocated to a safe site.

- Many listed species are also sought after for traditional medicine or by collectors and so the ECO should ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.

- The ECO should monitor construction activities in sensitive habitats such as near rivers and wetlands carefully to ensure that impacts to these areas are minimized.

Operational Phase

- Access to the site should be strictly controlled and all personnel entering or leaving the site should be required to sign and out with the security officers.

- The collecting of plants of their parts should be strictly forbidden and signs stating so should be placed at the entrance gates to the site.

Monitoring & Reporting Requirements

The following reporting and monitoring requirements are recommended as part of the plant rescue and protection plan:

- Preconstruction walk-through report detailing the location and distribution of all listed and protected species. This should include a walk-through of all infrastructure including all new access roads, turbine footprints, underground cables, power line routes, buildings and substations. The report should include recommendations of route adjustments where necessary, as well as provide a full accounting of how many individuals of each listed species will be impacted by the development.

- Monitoring during construction by the ECO to ensure that listed species and sensitive habitats are avoided. All incidents should be recorded along with the remedial measures implemented.

- Post construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.